The IRON AGE

Vol. 161, No. 3 — January 15, 1948

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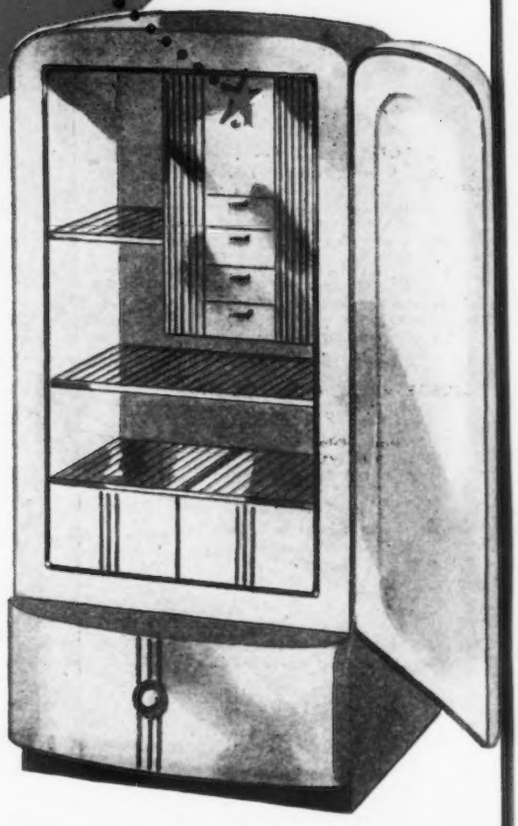

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Tax Justice

"HEADS I WIN, TAILS YOU LOSE" is the classic apostrophe to a sucker. This comment is implied in the American tax structure, particularly that part of it dealing with personal and corporate income taxes. The Treasury has made itself a senior partner in every corporation, in the personal income of every taxpayer. Unlike other senior partners, it makes no original investment, it incurs no financial risk.

If and when and to the degree that an individual or enterprise is successful, the state cuts itself in for a slice. This percentage mounts more rapidly than income, with the result that an individual in the million dollar bracket pays his partner 84 per cent. To the extent that this income originates in corporate earnings, it has previously been tapped by the Treasury. To the extent that it is retained by the owner until death, it is again leeched by the same "partner."

The singular feature of this partnership is the refusal of the senior member to share in any losses. With a peculiarly inverted generosity, he tells the junior partner that this loss—all of it—belongs to him. It is an odd irony that such a system of taxation should be labelled progressive, that the government which levies it should be considered enlightened and liberal.

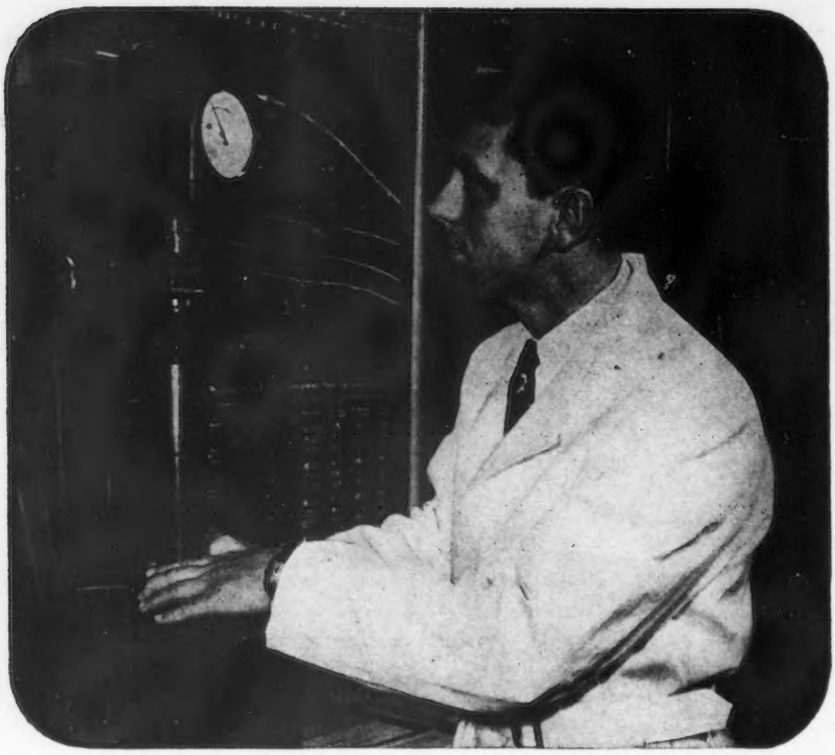
This brings us to the message on the state of the union. Recognizing the need for some action on taxation in view of the November election, the President proposes a flat cut of $40 for every taxpayer, no matter where he stands in the tax scale. This would remove approximately 10,000,000 from the tax rolls, the virtue of which need not be expounded in an election year. To these millions of taxpayers the relief will be 100%. The man at the top of the bracket with a million dollar income is "relieved" to the extent of $4.80 on every $100,000 of tax—one two-hundredths of a per cent. This is progression, to be sure, but in reverse.

Ignore for the moment the effect of relieving 10,000,000 voters from any consciousness of direct tax burden and consider the tax theory implied in this proposal.

Students of taxation classify tax systems in three main groups according to the incidence of the burden. The first may be called the free market system. The taxpayer buys a service from the state. He pays for it as he would for a ham sandwich—the same price as his neighbor. Liberals denounce this type of taxation as regressive. When taxes vary directly with income, their alleged inequity is apparently less pronounced. However, the final goal of "just" taxation became possible in this country with the passage of the Sixteenth Amendment. This opened the gates of legislative discretion. It permits a complete leveling of all incomes and it is this quality which presumably gives income taxation its "progressive" character.

It is apparent from the Presidential message that whenever taxes must be increased they will be raised in accordance with the progressive theory. On the other hand, when reductions are in order, equity —or can it be political expediency—demands that they be regressive, with the greater relief at the bottom and the least at the top.

Joseph Stagg Lawrence



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RYERSON STEEL

► Steelmakers will probably be asked soon to boost freight car steel shipments to a 14,000 car a month level and eventually to 16,000 M. But one source who correctly predicted last August that 1947 would not see 10,000 cars in any month now maintains that even with adequate steel shipments 14,000 car program will not be attained this year.

► Negotiations for the export of 100,000 tons of scrap iron at $26 a ton from the British-American zones in Germany to the United Kingdom are under way. Price compares to the $40 to $43 per ton which has been paid in Europe in recent months.

► A new type of rubber, resistant to heat, oil, ultra-violet light, and ozone and gas diffusion, has been put into production. The new rubber is available in both dry and latex forms. It may be used for gaskets, hose, belting, oil seals, insulation coating on electric motor coils, and wire jacketing.

► On display at the annual Paris automobile show was a small car with an integral chassis and body frame in cast magnesium. A magnesiun cylinder block for a 6 cylinder Talbot car was also shown.

► Although steel mill representatives agree that all industries continue to push hard for steel, they are beginning to question seriously the firmness of backlogs of builders of home freezing units, refrigerators and high-priced passenger cars and heavy trucks.

► Steel is the first basic industry in Britain to beat the government export quota. Shipments, reported at 5 pct over the target tonnage set for next June, are now being cut to give machinery and car makers more steel for their needs.

► Ford Motor Co. is using a series of new magnetic drain plugs which extend into an auto engine or housing and trap and hold harmful metal particles which may be present in the lubricant.

► Slowness of sales of prefabricated steel homes is due to the reluctance of builders to commit themselves for large scale projects at this time. Antiquated provisions of many building codes is also blamed. Shortage of steel has not been a factor.

► Customers of British shipyards are beginning to cancel their orders due to a great increase in costs--now about three times the prewar figure. One company in the market for three ships is now trying to get some kind of firm bid on them before placing the order.

► The newest of the super alloys to come from metallurgy's laboratories and rolling mills is a stainless steel, available in wrought form, which has high acid resistance qualities. The new product, developed by Carpenter Steel, is especially resistant to sulphuric acid.

► Aluminum producers are now working out schedules of price increases in fabricated products which are expected to be put into effect during the first quarter of the year.

► In the world of conversion deals for steel supply, one of the large steel companies is thought to perform finishing operations at the lowest cost. Rolling, pickling, oiling and shearing are done for $30 a ton.

► Price increases in steel products prior to the April wage negotiations will be largely confined to increases in extras, work on which is underway. Led off by alloy bar extra increases, the movement has already been followed by a stiff increase in cold-rolled sheets. Increases on nails and other products are expected to follow soon.

► Probable accomplishments of the Macy subcommittee, now looking into the steel gray market, should not be discounted yet. Instead of wasting time investigating "phantom" stocks, it will slap subpoenas on those reported to have made actual deliveries and demand that sources of supply be named. Industry is to assist by shutting off leaks discovered in regular distribution channels.

► A tiny new dry cell, with amalgamated zinc and mercuric oxide electrodes, is now available for many special applications. The new mercury cell is only half as heavy and less than half as big as conventional zinc-carbon flashlight cell.

Strain Gage Analysis of

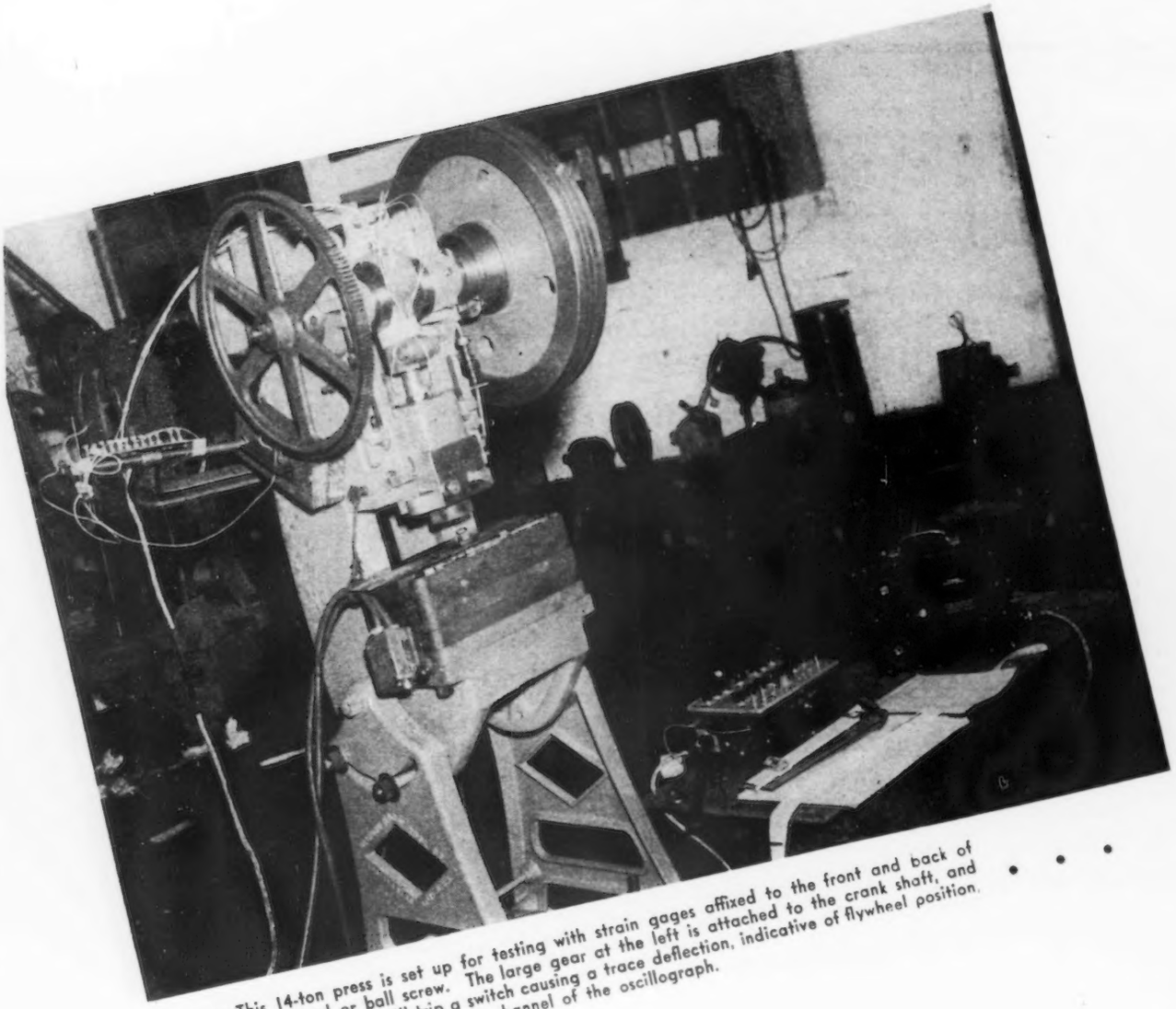


FIG. 1—This 14-ton press is set up for testing with strain gages affixed to the front and back of the connecting rod or ball screw. The large gear at the left is attached to the crank shaft, and each gear tooth in passing will trip a switch causing a trace deflection, indicative of flywheel position, on one channel of the oscillograph.

THE tonnage developed by a mechanical press is a complex function depending on flywheel size, the drop in flywheel rpm during the working stroke, and various friction factors. Utilizing electric strain gages and a recording oscillograph, the tonnages developed by a 14-ton and a 31-ton mechanical punch press were measured together with the change in flywheel rpm during the working part of the stroke. Electric strain gages were cemented to the front and back of the connecting rod or ball screw of the 14-ton press as shown in fig. 1.

A 180-tooth gear was attached to the press crankshaft, at the left in fig. 1, and a switch was attached to the press frame in such a manner that the passage of each gear tooth would close an electrical circuit causing a trace deflection on one channel of the oscillograph. The two strain gages were connected to a bridge box which was in turn connected to the oscillograph. The bridge box and oscillograph are shown on the table, bottom right, in fig. 1. The strain gage circuit was such that compressive strains in the ball screw would depress the oscillograph trace. A typical oscillograph pattern is shown in fig. 2.

Using this apparatus, it was possible to operate the press and simultaneously record continuously against time the connecting rod strains and flywheel position. From these recorded data it was possible to calculate the press tonnage and flywheel velocity at any given instant, as shown in fig. 3.

Mechanical Punch Presses

By GIVEN BREWER
Consulting Engineer, Laguna Beach, Calif.

Improvements in machine design are continually being called for and made, and the application of strain gages to machine analysis now provides precise test data impossible by other means. This article describes extensive dynamic and static tests, utilizing strain gages, on mechanical punch presses. The findings are reported and suggest design and construction improvements for greater efficiency and strength.

Tests were run simulating drawing and coining operations. Lead slugs were placed on the platen to simulate drawing, while the press was adjusted to squeeze a steel washer to simulate coining operations.

With the development of the first oscillogram, it was noticed that the stress at the back of the connecting rod was much higher than the stress recorded at the front, as shown in fig. 2. The operation of the strain gages had been previously checked by calibrating the ball screw with the attached gages in a standard testing machine. This test showed the gages to be linear up to at least 22 tons with the modulus of elasticity of the steel, as indicated by the gages, equal to 30.5 x 10^6 psi. As the modulus is known to be in the near vicinity of 30 x 10^6 psi, this correlation provided a further check on the accuracy of the gages. The difference then between the readings front and back on the connecting rod could only be ascribed to the presence of a large bending moment through the section. As the connecting rod has a round ball at the end, fig. 4, it appeared that a bending moment in the fore and aft plane could not exist. However, investigating the friction moment at the ball as shown on fig. 4, it was found that for the 14-ton press, the moment due to friction would equal approximately six times the average friction shear stress, f.

On one run, four lead slugs were compressed as in a drawing operation and it was found that the stress at the front of the ball screw was 3322 psi whereas the back stress was 18,600 psi, an average stress of 10,961 psi. This stress times 1.4 sq in., the cross-sectional area of the ball screw, is equal to 15,380 lb or 7.7 tons total pressure. The section modulus of the rod at the point of gage attachment, Z, is 0.175 in.^{3} The bending moment, BM, will equal:

$$BM = (f_{back} - f_{average}) \times Z = 7639 \times 0.175 = 1336 \text{ lb-in.}$$

where $f_{average}$ is the axial stress in the ball screw shank (compressive)

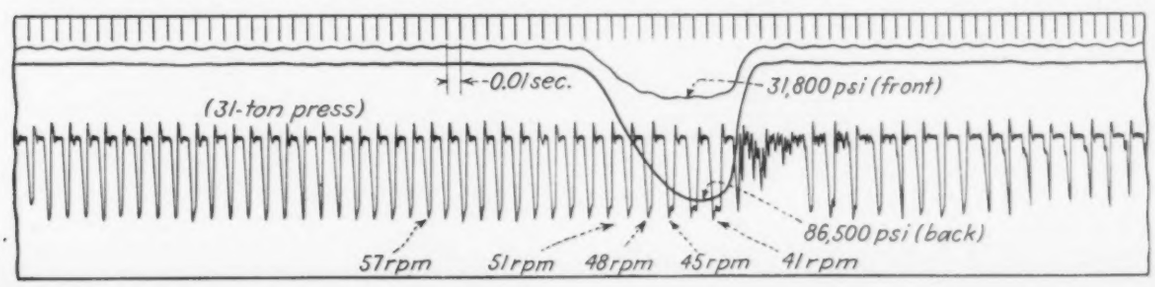
and, from fig. 4:

$$BM = M = 6.0 \times f$$

Therefore,

$$f = \frac{BM}{6} = \frac{1336}{6} = 222.6 \text{ psi, average friction force acting parallel to the surface of the ball.}$$

FIG. 2—Photograph of oscillograph made of a test run on a 31-ton press. Strain traces from the two strain gages attached to the ball screw shank are shown, and the timing notches representing passage of each gear tooth can be seen.



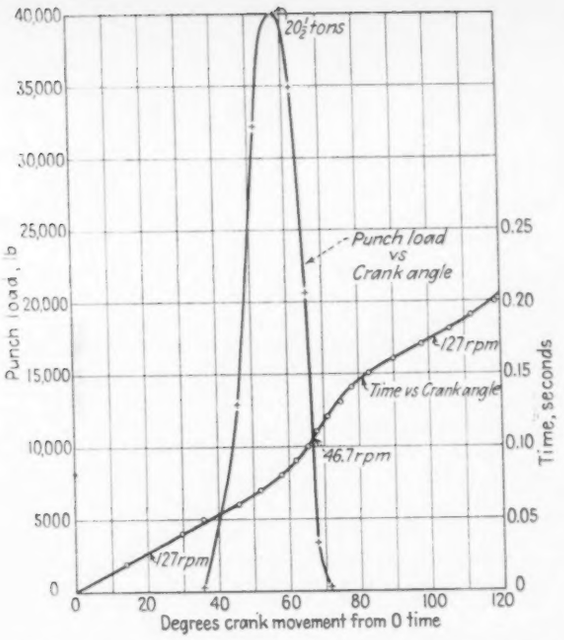


FIG. 3—Graph shows a plotting of data on time vs crank angle and punch load vs crank angle obtained from the oscillograph record of a coining operation on a 0.125 in. thick steel washer. The press being tested is shown in fig. 1. The test shows the maximum effort possible to be 20½ tons.

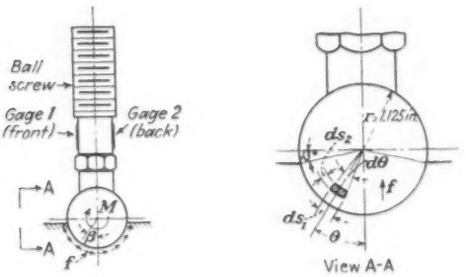
Now, as the normal bearing pressure was:

$$f_b = \frac{7.7 \times 2000}{3.8} = 4052 \text{ psi (bearing pressure normal to surface of the ball).}$$

The coefficient of friction, u, can be found:

$$u = \frac{f}{f_b} = \frac{222.6}{4052} = 0.055$$

As this friction coefficient is not abnormally high, it is at once apparent that the presence of this friction moment must be considered in the design of punch press connecting rods. Judging from these experiments the proportional limit of the ball screw steel should be at least double the average ball screw stress obtained by dividing the press tonnage by the connecting rod cross-section. The bending stresses observed fully explained why customers had reported permanent bending of the ball screw at tonnages far below those which the ball screw could withstand axially without suffering permanent set when loaded in the laboratory as shown in fig. 5.



$ds_1 = r \cdot d\theta$; and, $ds_2 = r \cdot \cos\theta \cdot d\beta$

$dM = 2 \cdot f \cdot r \cdot \cos\theta \cdot d\beta \cdot r^2 \cdot \cos\theta \cdot d\theta$

$$M = 2 \cdot f \cdot r^3 \int_{0.226}^{2.92} d\beta \int_{0}^{1.34} \cos\theta^2 \cdot d\theta$$

$$M = 7.67 \cdot f \left| \frac{\theta}{2} + \frac{1}{2} \sin\theta \cdot \cos\theta \right|_{0}^{1.34}$$

$M = 7.67 \cdot f \cdot 0.7815 = \underline{6.0 \cdot f}$

M = Friction moment at the ball

f = Friction shear stress

ds_1 = One side of the differential contact area involved in changing θ by $d\theta$

ds_2 = The other side of this area

β = Angle between a plane through the vertical axis of the ball and a plane bisecting the differential area and running through the horizontal axis of the ball

$d\theta$ = Differential angle used to sweep out the differential distance ds_1

$d\beta$ = Differential angle used to sweep out the differential distance ds_2

r = Radius of the ball = 1.125 in.

FIG. 4—This sketch shows the ball screw and the angular coordinate method used in calculating the friction moment.

Simulating a coining operation, a 0.125 in. thick steel washer was placed on the platen of the 14-ton press and the ram adjusted so that the press almost stalled at dead center while coining the washer. This test was devised to determine the maximum tonnage possible from the 14-ton press. Referring to fig. 3, wherein the significant data from this run are plotted, it may be seen that a maximum effort of 20½ tons was developed and that the flywheel slowed from 127 rpm to 46.7 rpm during the stroke, a 63 pct drop in speed giving up about 87 pct of its stored rotational energy.

From fig. 3, it will be noted that the flywheel is running at its slowest speed considerably after bottom center has been reached. Plotting punch load vs punch travel, fig. 6, for the run previously described, and planimetering the resulting area, it was discovered that the punch delivered about 72.5 ft-lb of energy to the work at bottom center; but only 41 ft-lb finally due to energy recovered from press spring. Yet the total energy given up by the flywheel was 192 ft-lb. This total flywheel energy given up was obtained by calculating the kinetic energy at 127 rpm and subtracting the energy at 46.7 rpm. Fig. 7 shows inertia calculations.

This means that about 151 ft-lb of energy from the flywheel was lost in friction. Assuming that the friction loss is largely confined to the two main frame bearings, shown in fig. 8, and the top connecting rod bearing, the average friction coefficient may be calculated. The total projected bearing area, connecting rod and frame, is 15.75 sq in., and each of the frame bearings has a projected area of 4.5 sq in. Therefore, the energy loss in one frame bearing will be 4.5 /15.75 x 151 ft-lb, or 43.1 ft-lb. Assuming that punch load vs crank travel is parabolic, the average bearing pressure in the end frame bearing will be:

$$f_b = \frac{20.5 \times 2000}{1.5 \times 2 \times 4.5} = 3037 \text{ psi (average)}$$

Now, the friction torque times the working angle, θ, of 30° (0.523 radians) can be equated to the friction loss of 43.1 ft-lb and the value of the friction coefficient, u, determined:

$$f \times \pi \times r \times L \times r \times \theta = 34.15 \times 12 \text{ (in.-lb)}$$

$$\times \pi \times (1)^2 \times 2.25 \times \frac{30}{57.3} = 43.1 \times 12$$

$$= 139.6 \text{ psi, the average friction stress}$$

$$u = \frac{f}{f_b} = \frac{139.6}{3037} = 0.046$$

From these calculations it can be seen that a great part of the flywheel energy is being lost in friction and that the efficiency of the press could be considerably improved by the substitu-

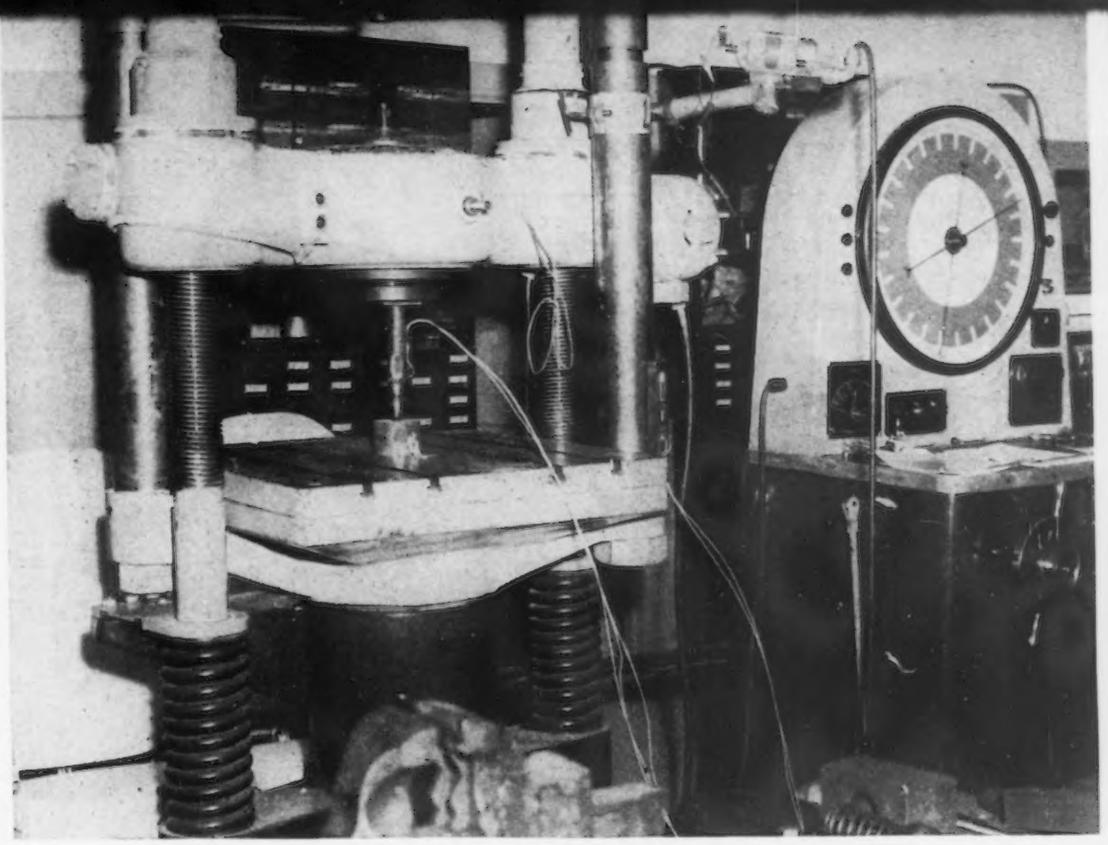


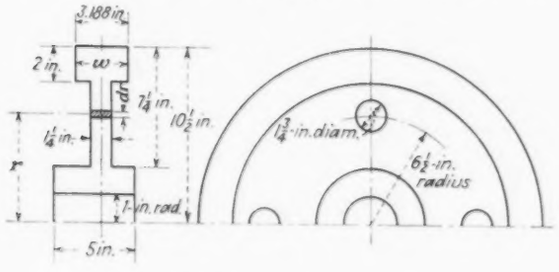
FIG. 5—The ball screw is shown mounted in a testing machine for a standard strain vs load test.

tion of roller bearings for the plain bearings now in vogue.

A 30-ton cast iron punch press, shown in fig. 9, was static tested by means of a mechanical jack on the press platen. Loads from 0 to 64½ tons were applied to the press with the resulting strains recorded by 60 electric strain gages, some of which are shown in their locations on fig. 9.

The purpose of the static test was to find the points of highest stress in the press frame and to quantitatively observe the effects of the tie rods upon the critical stresses and overall rigidity of the press.

FIG. 7—Dimensions of the press flywheel are shown, and the methods of calculating the polar moment of inertia and the rotational energy are indicated.



$$dI_p = w \cdot dr \cdot 2\pi r \cdot r^2 \rho$$

$$I_p = w \cdot \rho \cdot 2\pi \int r^3 \cdot dr = w \cdot \rho \cdot 2\pi \left| \frac{r^4}{4} \right|_{r_1}^{r_2}$$

$\rho = 0.26$ lb per cu in.

Therefore: $I_p = 1.25 \cdot 0.26 \cdot 2\pi \left| \frac{r^4}{4} \right|_{3.25}^{8.5} + 3.188 \cdot 0.26 \cdot 2\pi \left| \frac{r^4}{4} \right|_{8.5}^{10.5}$

$$I_p = 2.05 \cdot \frac{5095}{4} + 5.225 \cdot \frac{6900}{4}$$

$I_p = 11632$ lb-in.

$$I_p = \frac{11632}{32.2 \cdot 144} = 2.5 \text{ slug-ft}^2$$

Where: I = Polar moment of inertia for the flywheel in slug ft² and
ω = Flywheel velocity in radians per sec.

$$K.E. = \frac{I_p \omega^2}{2} = \frac{2.5}{2} (13.3)^2 = 222 \text{ ft lb @ 127 rpm}$$

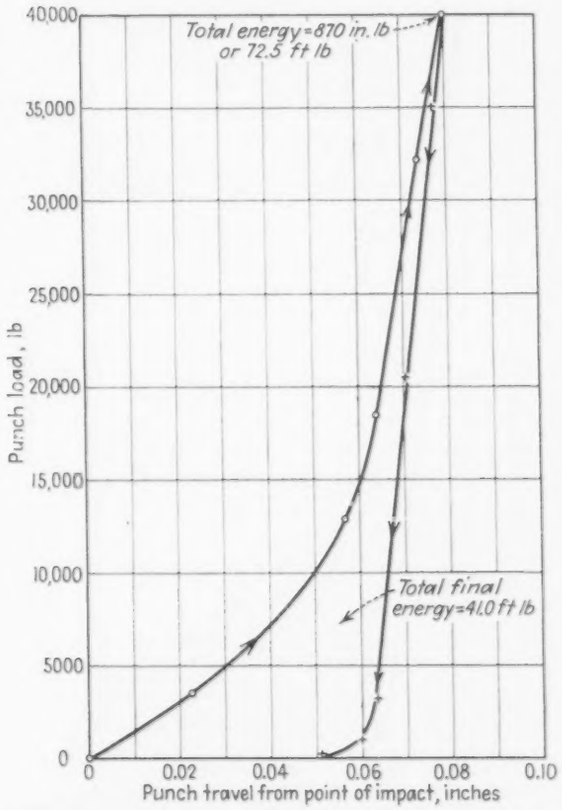
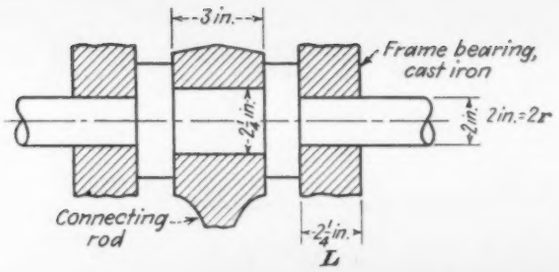


FIG. 6—Graph shows punch load vs punch ram travel for the test run data shown in fig. 3. Planimetering of the resulting area gives the energy produced which can then be compared with the flywheel energy to determine friction losses.



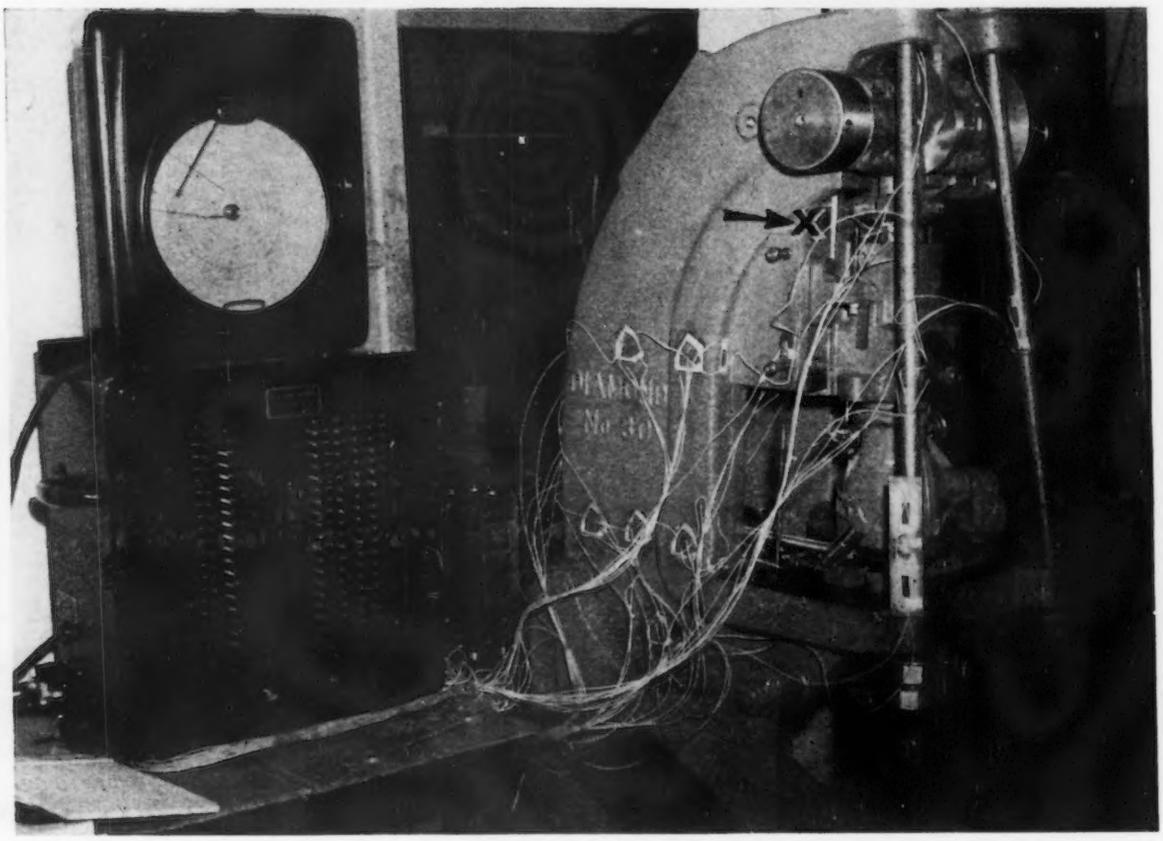
LEFT

FIG. 8—The cross-section of the crank shaft and frame bearings of the 14-ton press under test.

o o o

BELOW

FIG. 9—This 30-ton cast iron punch press is shown rigged with strain gages for static tests to reveal points of highest stress in the press frame. The gib fillet, marked with an *x*, and the fillet at the bed platen proved to be the high stress points.



Only two points of serious stress concentration were found, and as expected these points marked the positions of service failures. The fillet at the bed platen and the gib fillet, marked with an *x* on fig. 9, were found to have stresses appreciably higher than any other points checked. At 30-tons jack load on the platen, the bending stresses through most of the side frame were about 4500 psi maximum, but at the platen fillet a stress of 23,600 psi existed while 9400 psi was found at the gib fillet. As the ultimate strength of the cast iron comprising the Diamond punch press being tested was between 32,000 and 35,000 psi, the platen fillet stress was excessive and had to be reduced. Accordingly, the 30-ton press was remachined to provide ½-in. and ¾-in. radii platen fillets.

A number of ¼-in. electric strain gages were placed in the platen fillets and the press was retested with the results shown in fig. 10. It can be seen that by increasing the fillet radii from ¼ in. to ¾ in. the stress was reduced from a value of 23,600 psi to 14,050 psi at a jack load of 30 tons: To accomplish the same reduction in stress by strengthening the frame at the fillet

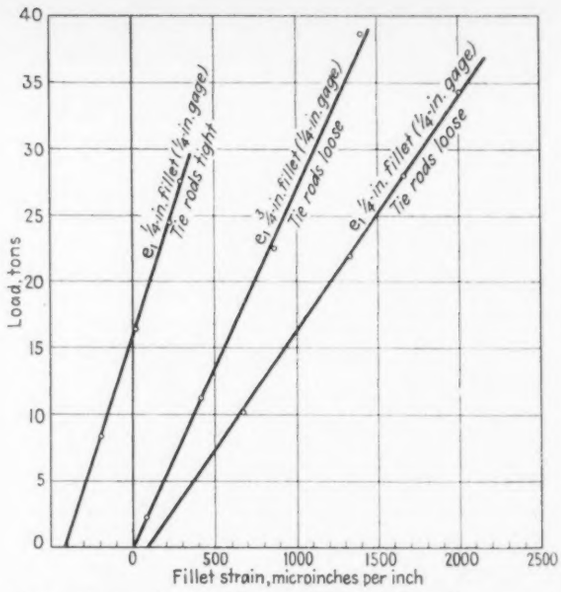


FIG. 10—Results of different platen fillet radii on strain gage tests are charted. It is evident that a ¾-in. radius shows 40 pct less strain than a ¼-in. radius even though there is less metal present.

platen juncture would have required a local increase in frame thickness of about 67 pct.

Assuming that the press should crack the frame when the ultimate strain of the cast iron is reached at the platen fillet, namely 6000 microinches per inch as shown on fig. 11, failure of the 30-ton press may be expected in the range of 166 tons. An unmachined 30-ton press frame having fillets approximately ¾ inch in radius was placed in a 300,000-lb testing machine and loaded to destruction, failure occurring at 109 tons with the crack initiating at the right hand frame fillet, as shown in fig. 12. Inspection of the casting revealed quite a large void just below the surface of the fillet, the presence of this void presumably accounting for the failure of the frame at less than the theoretical breaking load. Following discovery of the void on the static test, steps were taken to alter the casting technique to prevent voids of this nature in production frames.

So that the effect of the tie rods could be evaluated they were tightened as in production and although no torque wrench was used strain gage readings showed that the rod on the right hand frame had been tightened to a tensile load of 6630 lb while the left hand rod had been tightened to 6780 lb. Upon tightening the rods it was found that the ¼-in. platen fillet had been stressed in compression to 7800 psi, see fig. 10, with the desirable consequence that at a 30-ton ram load with the rods tight, the fillet stress was only 4680 psi as compared to the value of 23,600 psi observed when the tie rods were loose.

It was further determined from deflection studies that while the press opened 0.0019 in. per ton with the tie rods loose, the effect of tightening the rods to an average load of 6710 lb was to stiffen the press so that it opened only 0.0014 in. per ton. The deflection observations were made between the bottom of the gib way and the press platen. Undoubtedly the effect of tightening the rods in addition to reducing the opening of the press throat under load was also to decrease the angular deflection or rotation of the press under load, but this was not determined on this test. Press rotation has an important and deleterious effect on die life.

Of incidental interest is the fact that using the Theorum of Castigliano, it was theoretically determined that at 30 tons the press rotation at the base of the gib ways would be 0.097°. This quantity was experimentally measured and found to equal 0.135° at 30 tons, fairly good agreement considering the vagaries of cast iron.

The modulus of elasticity of the cast iron was determined on bars cut from the casting and was found to vary between 13 and 15 x 10^6 psi. As the modulus of elasticity for steel is 30 x 10^6 psi, it is obvious that a steel press having essentially the same weight and section as a cast iron press will have twice the rigidity as its cast iron counterpart. Since die life is a function of rigidity, it is difficult to understand the trade's seeming preference for cast iron. One reason given for the shop preference for cast iron has been that cast iron does not "yield" or "give." On the basis of reliable test data this argument is not valid, for cast iron does yield at about the same stress as does mild steel and furthermore

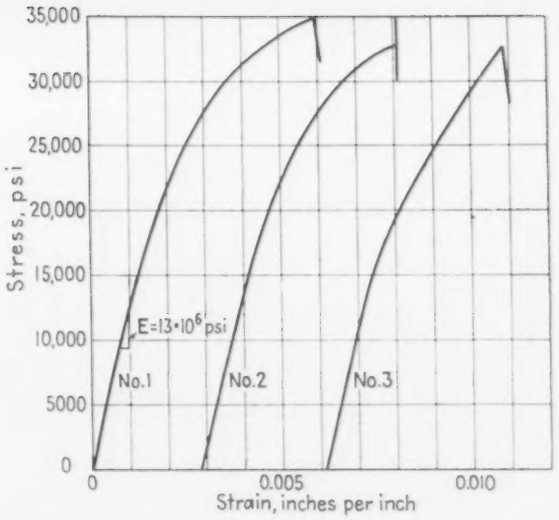


FIG. 11—Tensile stress-strain curves for cast iron test bars of punch press cast iron are shown. *E* represents the modulus of elasticity.

o o o

FIG. 12—Results of a destructive test on an unmachined 30-ton press frame in a 300,000-lb testing machine are shown. Failure occurred at a load of 109 tons with the crack initiating at the right hand frame fillet.

the poor ductility of cast iron is such as to guarantee far more frequent static failures than would be the case in its steel counterpart.

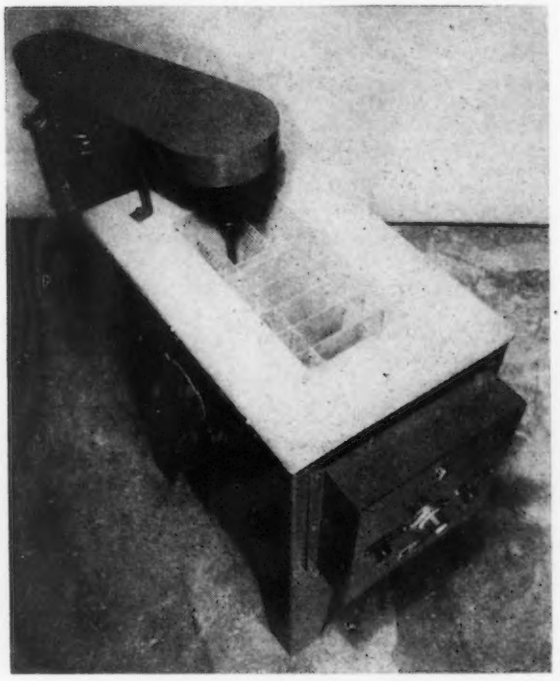
Summarizing this study, it would seem that a welded steel punch press employing roller bearings or high quality self-aligning aluminum bronze bearings could be built that would be no heavier than contemporary cast iron presses yet would double die life through its greater rigidity and operate with far less power consumption, through friction reduction, than the cast iron press.

New Type Tank Expedites Plastic Dipping Operations

A NEW plastic dipping tank recently developed incorporates three significant improvements over equipment formerly used for hot dipped plastic coatings. Designed primarily to control distribution of heat in order to reduce the thickness of hot dipped coatings the impeller-type mechanical agitator eliminates the formation of a film on top of the molten bath. A much more even heat distribution has been attained in this tank so that melting time has been materially shortened. Another feature is a metal grid inserted in the tank after it is turned off which greatly speeds up the melting process when the tank is ready to be put in use again. The tank is manufactured by Lindberg Engineering Co., Chicago, and is marketed by Globe Imperial Corp., Rockford, Ill.

Uneven bath temperature has always been a problem in small tanks used to plastic coat metal parts. To overcome this difficulty, the Plastic-Seal tanks are equipped with an impeller-type mechanical agitator which is driven from the top of the tank. The action of the vane impeller, mounted on a shaft extending to the bottom of the tank, induces radial flow of the molten plastic. A built-in baffle provides complete laminar circulation throughout the tank. Thus the formation of a film on the top of the molten bath, which can be caused by incomplete circulation, and the surface cooling and coagulating, is precluded.

The second important advantage of the new tank is in the design of the heating element. The elements are imbedded in one side only of porcelain refractors. These refractors are evenly spaced around the sides to obtain better insulation and heat is radiated in one direction only—toward the walls of the tank. As a result of the more even heat distribution obtained, melting time has been materially shortened. The tank is provided with thermostatic control to insure constant temperatures and overheating or scorching of the plastic material has been eliminated.



THE plastic dipping tank showing the heat dispersing grid in position. After the plastic becomes molten the grid is lifted out of the dipping compartment.

o o o

A most important feature of Plastic-Seal tanks is a new heat dispersal unit which is placed in the bath when the tank is shut off at the end of operations. In the accompanying illustration the egg crate form of metallic grid is shown in position for cooling the bath. Since all plastics are poor heat conductors, this unit serves to transfer heat from the walls of the tank on reheating and distribute it through the center of the bath. This arrangement greatly speeds up the melting process when first starting the tank. All tanks are also equipped with a premelting compartment which keeps new material from circulating in the dipping compartment until it has been brought to the proper temperature. This eliminates the possibility of newly added material interfering with the dipping operations.

As a result of the more efficient design and construction of these tanks, agitation and heating elements, normal melting time of 6 to 8 hr for the 44-lb capacity tank has been shortened to slightly under 2 hr.

Defects and Preventives in Weld Radiographs

THE appearance, cause and preventive of some confusing shadows in weld radiographs are described in an article prepared for the Committee of the British Welding Research Assn. on Radiography of Welded Pressure Vessels. The article entitled "Photographic Aspects of the Radiography of Welded High Pressure Vessels," by L. Mullins, in the October 1947 issue of the Transactions of the Institute of Welding, gives the recommendations of the Committee, and this subject of radiography defects is discussed, along with choice of materials, handling and processing X-ray films, and other phases of the subject.

The tabulation of defects in X-ray film covers dark and light shadows in the film and miscellaneous defects.

Dark Shadows

Appearance of Defect	Probable Cause	Suggested Preventive
Finely mottled fog.	Stale film sometimes due to keeping large stocks, and not using oldest film first.	Use fresh film; always maintain stock so that oldest film is used first.
Fog on edge or corner of film.	Exposure to white light: faulty closure of good cassette or use of defective cassette.	Handle film in proper safelighting conditions, fasten cassettes properly; repair faulty cassettes.
General fog with or without reflections from surface below film.	Exposure too near, (or for too long) to safelight or to overbright safelight: general fog may also be due to overdevelopment or to using old film which may have been badly stored.	Use recommended safelight under the conditions indicated by the film manufacturer. Use fresh film free from fog, develop at recommended time and temperature.
Dark circular marks.	Developer splashes before immersing whole film in developer.	Avoid such splashes.
Dark spots or marble-like areas.	Insufficient fixation.	Fix for correct time; use fresh fixing solution.
Dark branched lines, dark spots.	Static marks due to electrical discharges.	Avoid rubbing or sliding one film on another or drawing film quickly from wrapping paper.
Dark lines or cracks.	Scratches or cracks in lead intensifying screens.	Replace screens.
Dark fingerprints.	Film touches before development with fingers contaminated with chemicals, for example, certain metal salts.	Handle film by the edges with clean hands and use the protective folder as long as possible.
Dark spots or streaks	Contamination of film by metallic particles or metallic salts.	Use only stainless steel, nickel or plastic stirrers, etc.; avoid metal containers or cheap enamel containers for fixing solution.

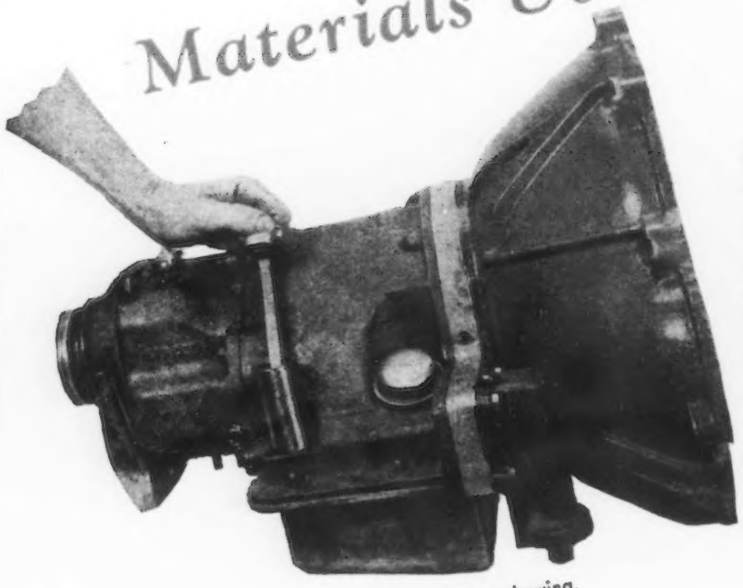
Light Shadows

Appearance of Defect	Probable Cause	Suggested Preventive
Light areas usually crescent shaped.	Pressure marks due to faulty handling of film, for example, buckling or localized pressure on the film generally prior to exposure; or to fixer adhering to the hanger from its previous use.	Handle film with care: moonshaped pressure marks are avoided by handling the film by one corner and keeping it flat. Rinse and dry hangers before using again.
Light circular patches.	Air bubbles on film during development.	Agitation immediately on immersion during development.
Light fingerprints.	Film touched before development with greasy fingers.	As for dark finger-prints.
Circular or "drop" shaped light patches.	Splashes of water or fixer on film before developing.	Avoid such splashes.
Light spots or areas.	Dust or paper between the film and the intensifying screens.	Avoid dust, etc., between the screens and film.
Light spots or lines.	Spots on, or cracks in fluorescent intensifying screens.	Use new screens if marks cannot be removed by washing with castile soap.
Light spots or streaks.	Oil contamination of film before development or of developer.	Handle film only with clean hands: Keep developer free from oil.

Miscellaneous

Appearance of Defect	Probable Cause	Suggested Preventive
Sharply outlined light or dark areas.	Nonuniform flow or developer over film when immersing it in developer.	Maintain the uniform flow of developer over the film when immersing in it.
Images of wood, grain, wallbrick, etc.	Previous exposure of the box of film to X-rays.	Store films away from X-rays and radium sources.
Small depressions with black edges.	Bacterial action in processing, generally in tropical climates or in hot weather.	Avoid washing in water which is too warm and avoid drying in too damp an atmosphere.
Wavy marble-like marks, increased density below light areas, reduced density below heavily exposed areas.	Insufficient agitation of developer.	Effective agitation during development.
Reticulation (of grain of leather).	Differences in temperature between successive processing baths.	Keep solution temperatures uniform.
Solarization (tone reversal).	Lengthy exposure to unsafe light after exposure.	Avoid light fogging; check safelights.

Materials Used in the New Buick



EXTERIOR of the assembled transmission showing, right to left, the flywheel bell-housing, which bolts to the engine crankcase; one of the accumulator housings; the die cast aluminum reaction flange; the planetary gear housing, below which is the stamped steel oil reservoir, and the housing for a part of the universal joint.

Outstanding among the design developments of the 1948 automobile is the new Buick automatic transmission. Combining, essentially, a torque converter and a fluid coupling, the unit places some unusual service demands on the materials used in its construction. This article describes the specific materials used in the unit, which include die castings, plaster castings, gray iron castings, rolled steel, various copper-base alloys and synthetic rubber. An explanation of the general functioning of the component units is also given.

OUTSTANDING among new developments for the 1948 motor cars is a brand new automatic transmission designed by Buick engineers. No clutch pedal is required with this transmission.

Basically, the transmission depends upon a turbo-type unit that combines a fluid coupling with a torque converter which includes a two-unit stator and a two-stage turbo pump. Normally, the converter provides ample torque multiplication for starting, acceleration and all ordinary forward driving. For emergencies, however, there is an emergency low that gives further reduction through a set of planetary gears. The latter also affords a means for reverse.

During the war, Buick built Hell Cat tank destroyers having a transmission operating on a similar principle. The new transmission is a development of this type adapted, of course, to motor car requirements. No clutch pedal is needed and there is no shifting of gears, into or out of mesh.

The design of this new transmission to permit production manufacture on a high production basis at minimum cost posed a number of unusual production and metallurgical problems. In view of the varied service requirements of the components of the transmission, it is not surprising that there are used in the construction of the unit several different types of castings, as well as numerous parts of wrought steel and some wrought copper-base materials.

In some respects, the most unusual parts, both from production and metallurgical angles, are the aluminum alloy components of the converter assembly, namely the primary and secondary pumps, the converter turbine and the two stators. All of these are thin-wall castings, produced within exceptionally close as-cast dimensional limits, and all have integrally cast vanes, the sections of which are varied in thickness from sharp edges at the ends of the vanes to maximum thickness at intermediate points. These sections constitute foils, the contours of which are carefully calculated to produce the most efficient flow of oil along and between vane surfaces as well as to direct the flow in prescribed directions, much as with other types of turbine blades. The converter is, of course, designed to fit Buick torque and horsepower performance.

Buick purchases these converter castings. Details of the fabrication cannot be given here. The castings are made, however, in plaster and sand molds that have plaster cores to form the precisely shaped passages between the vanes. The cores have to be disintegrated when removed

Automatic Transmission

By HERBERT CHASE

but leave unusually smooth casting surfaces.

For these castings, the alloy used has the following composition: Si 3.5 to 4.5 pct, Cu 3.5 to 4.25 pct, Mg 0.35 to 0.55, Fe 1.0 pct max., Pb 0.50 pct max, Mn 0.60 pct max, Ti & Cr 0.20 pct max, Ni 0.20 pct max, Sn 0.50 pct max, other impurities 0.30 pct max, remainder Al.

This alloy casts readily and is not difficult to machine. It is solution treated at about 960°F for six hours and after quenching is age hardened at 500°F for 5 hr giving a Bhn of 75 to 90 (500 kg load). No other physicals are specified by Buick but the probable minimum tensile strength is given as about 35,000 psi.

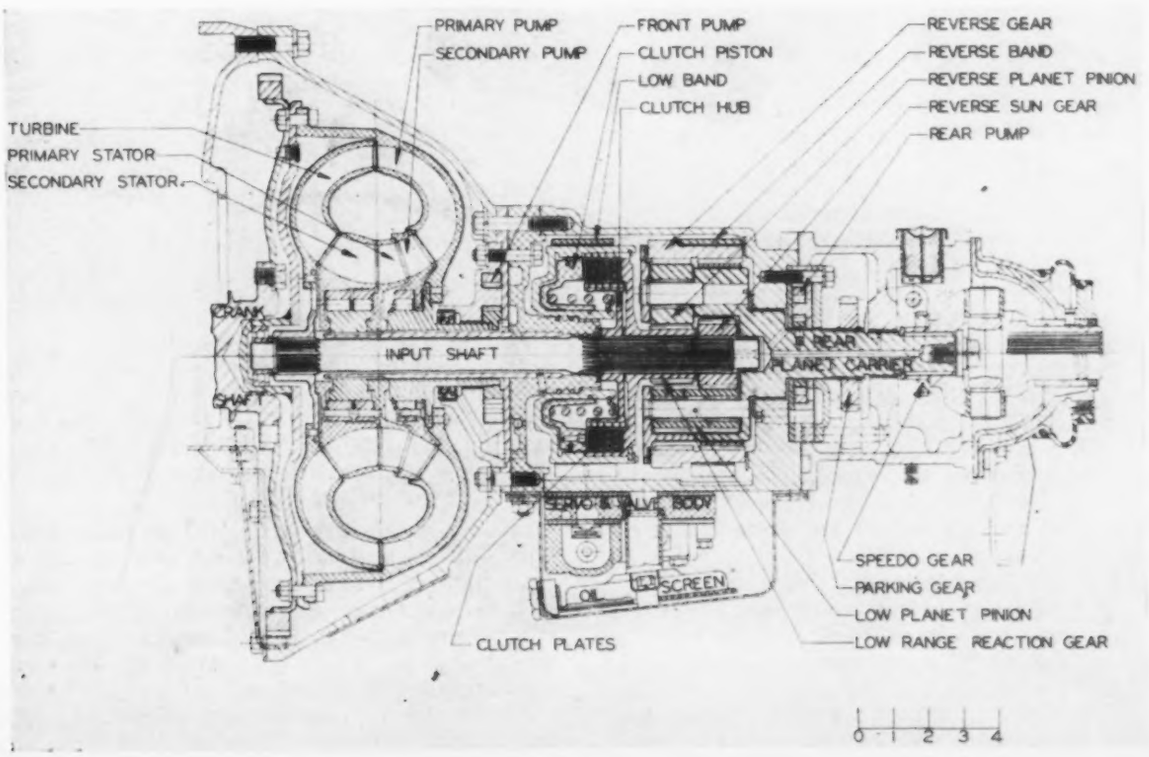
In addition to these plaster mold castings there are several aluminum die castings purchased for such parts as the clutch piston, Servo valve body, main valve body and the reaction flange plate. Die casting is chosen for producing these parts because it is a rapid process and the castings can be precisely cored and held within quite close dimensions so that a minimum of machining is needed. All these die castings are made from a high silicon (10.0 to 12.5 pct) alloy (ASTM S9, Alcoa 13), chosen because it casts readily, facilitates complex coring and has a fairly low coefficient of expansion (0.0000111 in. per in. per °F).

This alloy is not excessively difficult to machine, despite the high silicon, as long as iron is kept below 1.25 pct, the maximum limit, which is readily held in castings produced in cold chamber machines. To make sure of good dimensional stability, Buick specifies heating the castings for 4 hr at 350°F. Tensile strength is specified as 33,000 psi min, but no elongation is specified. Brinell hardness is 50 to 65 (500 kg load).

All three sections of the transmission housings and several smaller castings are produced from machinery gray iron that meets GM specification 14M. The same gray iron, with the addition of 0.20 pct Mo (as is employed for brake drums by Buick) is used for the outer member of the plate clutch and for the internal reverse gear, partly because these components have external clutch bands that may generate some heat. These castings have 163 to 207 Bhn and good dimensional stability after heating to 1050°F for 2 hr.

In the transmission are several steel-back

VERTICAL section through the axis of the new Buick transmission showing the torque converter, left, planetary unit, center, and output unit, right.



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ABOVE

TYPICAL of the material and production problems involved in the new transmission is this converter assembly which is a group of aluminum castings. This sectioned view shows the secondary pump turning with the primary pump. The stators are not moving.

o o o

DIE cast aluminum reaction flange, showing some of the cored oil channels, that greatly reduce the piping required as well as lightening the part, and other cored recesses.

friction facing containing bronze powder and asbestos fibre.

Bands, having an inner coating of friction material 0.046-in. thick applied with a resinous binder, are of 5140 steel heat treated to yield 32 to 36 Rc hardness. In this case, a high strength material is needed. Some small struts for band operation are forged from 1050 steel that is induction hardened for a distance of ⅜ to ½ in. at one end, other portions remaining soft. The same material is applied in roller clutch hubs that are induction hardened (after quenching, drawing and machining) on some surfaces where rollers bear.

bronze bushings on the bearing surface of which is cast (by the Cleveland Graphite Bronze process) a bronze that meets GM specification 4217M. This surface is ball-indented to hold oil and contains 8 pct Pb, 4 pct Zn and 4 pct Sn, remainder copper. Also employed, more or less as an alternative, are solid bronze bushings and washers made to GM specification 4077M, which calls for 4 pct Pb, 4 pct Sn and 2.75 pct Zn, remainder copper. The choice depends largely on availability.

Another bronze used alternatively for some parts is one sand cast to GM specification 4048M (88 pct Cu, 10 pct Sn and 2 pct Zn) in place of wrought bronze, not now available.

There are, of course, many steel parts in the transmission, those for carburizing including SAE 4620, 5120, and 8620. Of these, planet gears are made from 4620 and are given a case of 0.008 to 0.012 in. SAE 5120 and 5140 are both used for larger parts. The former specification, 5120, is carburized to a case depth of 0.040 to 0.050 in. SAE 8620 is used for planet pins and some other small pins that are given a case of 0.030 to 0.040 in.

SAE 1115 steel is chosen for some ordinary shafts and pins where wear resistance is required but no alloying elements are necessary. For clutch plates that have no friction coating, 1040 bright finish cold rolled steel, purchased with 24 to 30 Rc hardness, is used. Mating clutch plates are of 1010 steel, which is coated with a sintered

As portions of the transmission may attain temperatures up to 350°F, it is necessary to employ spring wire that will not suffer substantial loss in tension at this temperature. The wire used is a Cr-Si type. Its loss in tension is about 2.2 pct when stressed to 80,000 psi, as against 3.5 pct for 1060 carbon steel. Composition of the spring wire must meet one or the other of the following alternative specifications:

	Type I	*Type II*
C, pct	0.50-0.60	0.65-0.75
Cr, pct	0.50-0.80	0.40-0.70
Si, pct	1.20-1.60	0.65-0.95
Mn, pct	0.50-0.80	0.60-0.90
P, pct	0.04 Max	0.04 Max

Hardness is held to 48 to 52 Rc.

Input shafts are made from 5140 steel, quenched and drawn to 32 to 36 Rc. Gears for the oil pump are made from 1050 steel for the external and 1020 for the internal gear, both gears as well as a thrust washer and cover being given Parker Lubrite treatment.

Certain of the seals of the lip type are molded from GM specification 1375M-BZ Hycar synthetic rubber which is resistant to the oil used. Flat seals used at flanges are of vulcanized fiber that has a thin synthetic rubber coating. For the hydraulic fluid, a low tar content oil (Socony Vacuum WA 389) is chosen.

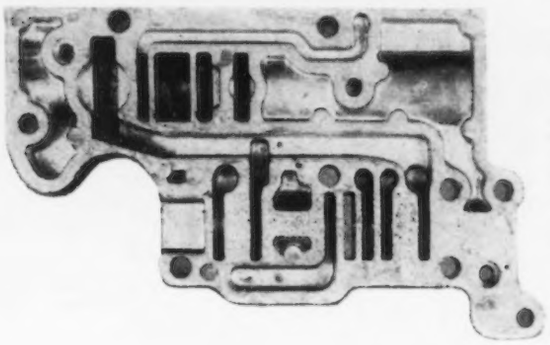
Aluminum torque converter members that have flanged steel hubs are riveted to these hubs by

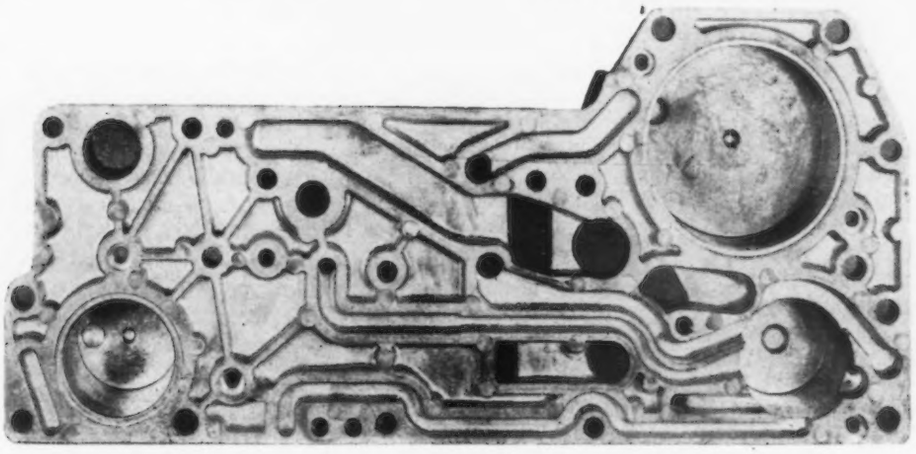
17ST aluminum rivets, as neither soft aluminum nor steel rivets have proved satisfactory.

Aside from the production of the aluminum converter castings, fabrication follows fairly conventional lines, as the other individual parts do not differ greatly from the general types familiar in motor car manufacture. Additional equipment has been installed for producing or machining such parts as could not be handled along with other production of Buick components.

When the new transmission is installed in an automobile, its control is effected entirely from a lever mounted under the steering wheel and having a pointer moving over a quadrant marked to indicate, from left to right, parking, neutral, driving, low and reverse positions.

Normally, the driver merely places the lever at *D* (driving position) and then presses the accelerator. The car starts smoothly and accelerates as rapidly as desired, as the converter functions and automatically provides such torque multiplication as is needed. When the engine at any given accelerator position develops sufficient torque to propel the car, the converter ceases to act as a torque multiplier and becomes a fluid coupling with negligible slip. If multiplied torque is again needed, say for rapid acceleration or hill climbing, the converter again comes automatically into use. The operator merely controls speed with the accelerator and does not know whether the transmission is acting as a converter or as a fluid coupling. Braking is done in the normal way, although the engine can be used as a brake as in conventional transmissions.





TWO of the important aluminum die castings that constitute the Servo body (below), and the smaller valve body. Both include much complex coring of passages for oil and other recesses.

Should a condition requiring torque multiplication beyond the 2.25:1 ratio that the converter provides be met (it will not be in any save most unusual conditions) the control lever is shifted to *L* (emergency low) and a further 1.82 to 1 reduction is provided automatically by planetary gears. For reverse, a shift to *R* is made and the planetary functions as a reverse gear. In neutral (*N*) there is, of course, no transfer of power to the rear wheels and when in parking position (*P*), the rear wheels are locked positively by engaging a pawl with a coarse pitch gear on the output shaft.

A simple linkage connects the control lever to a shift control valve in the transmission. All controls inside the transmission are operated hydraulically from one of the two gear pumps. One of these is engine driven and the other is driven by the output shaft which is connected, of course, to the propeller shaft and thus to the rear wheels.

Fig. 1 shows a vertical longitudinal section through the transmission, which has a three-section cast iron housing. Of these sections, the forward one contains a light steel flywheel to which the primary converter pump is bolted. Inside this pump housing is (front to back) the converter turbine, a two-stage stator and a secondary converter pump. Inside the second (intermediate) housing section is the planetary gear, a plate clutch and two bands by which the planetary gears are controlled. Below this section is a drawn steel oil pan containing an oil screen and an aluminum Servo body and valve body. Another and larger aluminum casting for directing the oil is located between the front and intermediate portions of the housing. Back of the latter is the rear housing section that encloses the parking lock gear, speedometer gear and universal joint.

There is practically no piping required with the hydraulic systems because oil passages are either cored or drilled in castings. The only external oil piping consists of two short lengths that connect the converter to a cooler through which water from the engine radiator and hydraulic fluid from the transmission flow in separate circuits. One of the gear pumps mentioned above feeds oil to the converter and circulates it through the cooler.

Wrinkle

By E. A. ZAHN
Works Laboratory, General Electric Co., Schenectady

FIG. 1—Wrinkle finishes are attractive and efficient. One effective use is for instruments, such as on this time-interval meter used in testing aircraft relays.

WRINKLE paint finishes offer attractive, efficient, and semi-durable finishes for a wide variety of small parts and equipment that are enclosed in metallic cases. The attractiveness and usefulness of this method of finishing has long been recognized by manufacturers, but frequently the difficulty in obtaining a consistently uniform product has deterred its use.

The control of wrinkle finishes is one of the most difficult jobs in organic finishing. This is the result of the fact that the elements that affect the pattern, from variations in the enamel itself to the type of pattern selected and its ultimate use, are so complex that control in the usual sense often becomes impossible. Production and consistent reproduction of the excellent finishes shown in figs. 1 and 2 require careful attention to enamels, base metals, product design, application technique, and drying atmospheres, time and temperature.

It is possible, however, to establish general principles indicating the horizontal trend in ease of control among the finishes, and then to emphasize on a vertical scale the factors that affect the quality of the individual finish, regardless of its position on the horizontal scale.

Thus, it has been rather well established that the finer and duller a pattern becomes, the easier it is to control and establish standards for it. This, in turn, obviously points out that control standards ease in the direction of flat finishes. As an example, in hammer-effect finishes, the smaller the pattern, the greater is the number of small drops of solvent used, and the easier it is to control. Conversely, it is also true that the larger, coarser and more complex the finish, the more complex will be the factors in its control.

Vertically, however, it is possible to establish and isolate at least 25 specific factors, each of which has a marked effect upon the wrinkle finish being applied, no matter what its type or texture. These 25 factors may be listed as follows:

1—WET FILM THICKNESS: Dried wrinkle finishes cannot be accurately measured in terms of film thickness. Film thickness is therefore in direct relation to the wet amount of material applied, and as the wet film thickness increases or decreases, pattern depth and size change accordingly. This hazard can be minimized by a number of methods, including viscosity control, temperature control and operator motion study.

2—APPLICATION: Even when nearly perfect control is exercised in every handling feature of wrinkle enamel application, there may still be a difference in pattern between the vertical and horizontal surfaces of the part being finished. The shape of the structure being finished, and the accessibility of its surfaces, also determine the pattern. Usually, this pattern difference can be minimized by selecting finer patterns and applying them slower.

3—BASE METAL DIMENSIONS: The speed at which heat is accumulated on the work is directly proportional to the weight of the metal involved. When there are great differences between the weights and thicknesses of the metal parts being assembled, the pattern match is nearly always poor. Use of finer patterns or coordinating the out-of-oven time to compensate for the weight differences is at best only a partial remedy. An alternative is to use different enamels for the various parts, each enamel being suited to the thickness and all having at least fairly coincidental drying times. From an economic standpoint, however, this has seldom proved satisfactory.

4—DIFFERENCE IN SURFACE TEXTURE: Usually castings have a porous surface that sheet metal does not have, and the same wrinkle pattern applied to each will produce different results. The use of two different enamels is one possible solution. Even if this is done, however, there will usually be a difference between the two. The difference in appearance of the finishes on a casting and on strip steel, using identical enamels and application techniques, is shown in fig. 3.

Finishes — *25 Control Points*

To produce uniform wrinkle finishes consistently, careful control must be exercised over the many phases of the production process that may vary from time to time under normal operating conditions. The author has isolated 25 specific factors, each of which can have a marked effect upon the finish regardless of its type or texture, and outlines methods for controlling these variables.

5—BASE METAL COMPOSITION: Various metals cause wrinkle enamels to behave differently. Of these, sheet and cast brass are the most difficult to handle. Such finish variation may be caused by the heat conductivity characteristics of each metal. As opposed to the high heat conductivity of aluminum or its alloys, the low heat conductivity of brass allows time for the wet enamel to gather on edges and follow scratches and other defects. A wrinkle finish on brass may minimize surface imperfections in one case and exaggerate them in another. A sample of a good wrinkle finish on brass is shown in fig. 4, along with a finish on strip steel for comparison.

6—ENAMEL VISCOSITY: Viscosity of the enamel at the time of solution is important. There is a basic necessity for viscosity control at the point of application. As the temperature in the material drops the viscosity increases, so that at lower temperatures a lesser volume of paint leaves the gun because of this viscosity increase. To produce uniform work temperature differences should be compensated for by varying application speed.

In the case of uniform production, application motion speed may be adjusted to result in more uniform results. This is usually not advisable, however, if more than one type of metal, or differently shaped parts are being finished.

7—ENAMEL AGE: Shelf life of the materials in stock is one of the most important control factors and often one of the most neglected. Freshly manufactured wrinkle enamels often produce a different pattern than would be produced after a long storage of the liquid. This is caused by the length of a reaction that occurs in the package during the period before use. The best remedy is to purchase materials in containers sized to a day's production. The additional gallon cost in smaller containers is more than balanced in the long run.

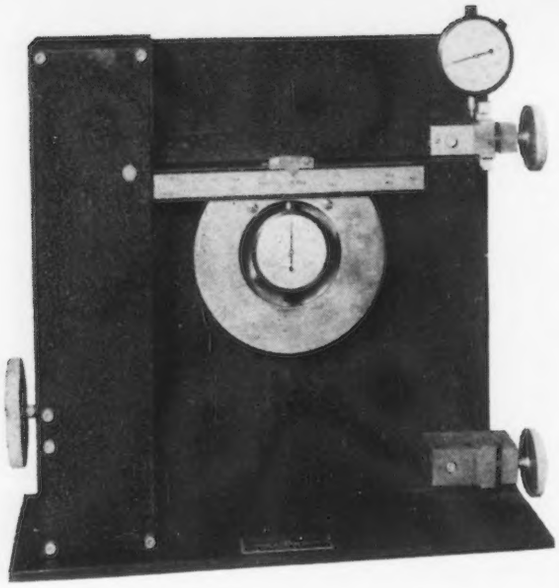
8—EFFECT OF ATMOSPHERE: Partial oxidation results from the effect of air on liquid material. Surface oxidation is the basis of wrinkle pattern formation. Contact of air and enamel prior to application influences the ultimate pattern formation. Small containers and minimum stocking are the only adequate solution to this problem. Some manufacturers supply the enamel and wrinkling medium in separate containers. In this way, the material can be stored for a longer time.

9—APPLICATION TO DRYING TIME: The length of time after application and before putting finished product in oven also affects the finish pattern. The ideal wrinkle finish material would be one which would produce an identical pattern whether it was put into the oven immediately after spraying or allowed to air dry for a while. Practically speaking, however, such materials do not exist. There are some wrinkle enamels, mostly in the small pattern types, which can stand 10 to 20 min at room temperature before baking without seriously affecting the pattern.

10—DRYING TEMPERATURE V. PATTERN DEPTH: Most wrinkle enamels will produce the maximum in pattern distinction or depth when the heat is applied suddenly. The light weight parts, of course, reach maximum temperature quickly, while the heavier parts take longer. The time required to load a batch type oven makes it necessary to apply heat after the oven is fully loaded. If racks or conveyers are available, the oven should be at heat before loading. Some manufacturers preheat castings to make up the difference in temperature losses; others use two different enamels for sheet stock and castings in an endeavor to get uniform finishes.

11—DRYING TIME: Gloss has a direct relationship to the amount of time the part is in the oven. Most wrinkle enamels do not show a pattern difference when they are baked longer than they should be. They do, however, show a decrease in gloss when exposed too long to too high a temperature. The same is true of some smooth finishes. Every paint material formulated for baking has its own particular heat requirement, which varies only by compensating time and temperature within predetermined limits. No baking material should be used on a variable baking cycle beyond its predetermined limits.

12—OVEN ATMOSPHERES: Since the oxidation rate is directly responsible for the wrinkle patterns and elevated temperatures speed up oxida-



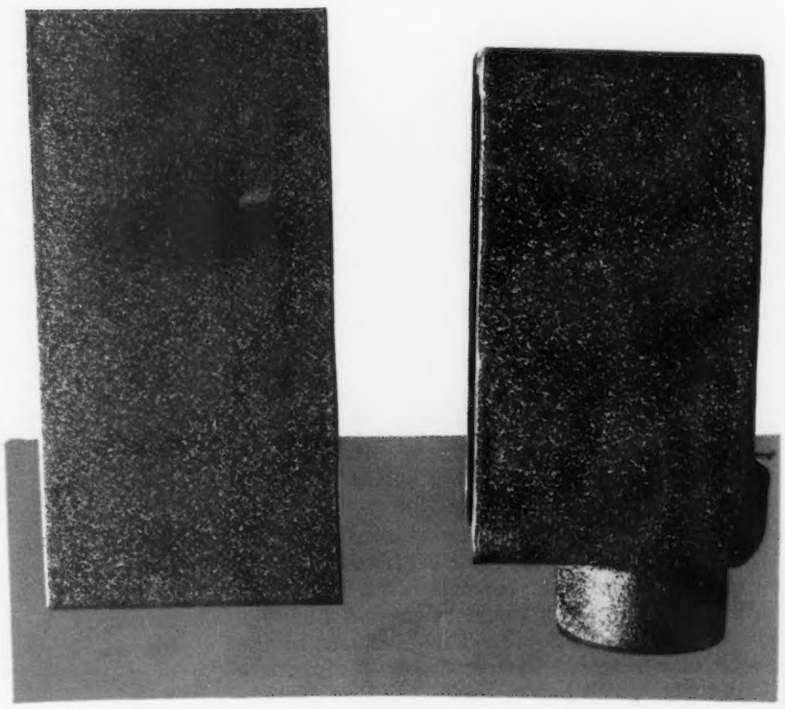
ABOVE

FIG. 2—Production of consistently good wrinkle finishes, like the one on this LSE copper-wire stiffness tester, requires careful attention to production and application details.

o o o

RIGHT

FIG. 3—Using identical enamels and application techniques, there is a marked difference between the coating on the steel strip at left and on the steel cast part at right.



move solvent fumes, and this air must be replaced with fresh air from outside of the oven. The heated air in the oven must be in motion to obtain uniform temperature from the top to the bottom of the oven. When infra-red open bank or forced circulation oven baking is used, there is a continuous supply of good oxidizing air moving upward across the work, but infra-red baking of wrinkles is not always advisable unless very special enamel formulations have been made which will cure in very short cycles. The infra-red baking process is usually considered too expensive for long bakes.

13—UNDERCOATS AND FILLERS: In instances where priming coats or spot fillers are used, a variation in pattern is often noticed. If they are properly chosen the undercoats and fillers must be of a hard type, and nonporous. This variation can sometimes be eliminated by baking before applying the wrinkle. Exceptions, which prove their own problems, are factors like formation, it is important that a continuous supply of fresh air be forced into the oven. Most ovens are so constructed as to replace fume laden air. An oven with insufficient air replacement may produce an excellent pattern with a small load and no pattern at all with a full load.

The solvent fume laden air in the oven not only prevents pattern formation, but also represents a hazard as an explosive condition. Fugitive solvents, such as those from a vapor degreaser, can raise havoc with wrinkle pattern formation if they find their way into the oven.

A properly designed oven should be one with at least two heat zones. The first heat zone would bring the work up to temperature quickly, and the second would hold the work at the baking temperature. There must be an exhaust to remove foreign materials such as oil or an air pocket in the casting, which come to the surface to mar the delicate wrinkle pattern.

14—OPERATOR TECHNIQUE: This is responsible for a multitude of failures in producing wrinkle pattern uniformity. Where very large production exists, and operators apply only one type of material day after day, all of the common problems of wrinkle enamel pattern control are at a minimum. Every operator, who, incidentally, should be specially trained for this work has a slightly different application technique.

Some prefer to apply a mist coat, so that a larger volume of enamel can be applied later without runs. Other operators insist on rotating the work piece rapidly while spraying, in order to get an even distribution of paint. The

training of operators should include instructions in handling the particular parts involved, characteristics of the particular material of which they are built, and with all instructions slanted toward the desired pattern.

15—AIR AND FLUID PRESSURES: It has been pointed out that wrinkle patterns form because of rapid surface oxidation. The air volume used in atomization, therefore, may also affect the paint during application. A 30-lb fluid pressure at 70-lb atomizing pressure would obviously produce a different pattern than a 30-lb fluid pressure and a 50-lb atomizing pressure. In the latter case, the paint would have considerably less contact with air as it reaches the surface being coated. The best fluid pressure is the lowest possible pressure capable of delivering a reasonable supply to the gun. The best air pressure is the lowest possible pressure which will atomize sufficiently for application. Lower pressures mean less material waste and less pattern variable.

16—SPRAY WIDTH: The spray width adjustment on a gun is important and, if properly made, allows for overlapping the gun passes on the work. If an operator working at a given air pressure uses a 3-in. fan spray adjustment, and another operator using the same pressure adjusts his gun to full fan width, the latter will produce a more uniform surface finish while the former may show streaks on his work due to insufficient overlapping of the spray.

The width adjustment of a spray gun should be in accordance to the size and shape of the work. If the work is uniform in size and shape, it is advisable to lock all gun and air adjustments to prevent tampering by the individual operators.

17—AIR CONTAMINATION: Contamination of air in work area frequently results in defects, such as fish eyes, pyramids, and many others, that are frequently blamed on the paint. Such defects are seldom caused by the paint. This can readily be verified by investigating the paint manufacturing process. The greater part of these surface defects are caused by particles of foreign materials that settle in the wet wrinkle paint surface before it is baked or on the surface before it is painted. There are many sources of dirt particles in the paint area, such as walls of the paint booth, conveyers, or oven exhausts. Every spray room should be given sufficient good housekeeping attention in order to keep these errors at a minimum.

18—SKINNING: Wrinkle enamels can form a skin on the liquid surface faster than any other organic paint material. These enamels are made to oxidize rapidly in order to form the wrinkle pattern. When the formed skin is removed, some of the principal wrinkling ingredients are likewise removed. After the skin has been removed, the pattern will be different than before. Some wrinkle enamels will skin in the container before opening, and some will even skin in the container while spraying. Still other wrinkle enamels absorb oxygen and become unusable because of partial oxidation throughout the wet body of material.

The only effective cure for excess skinning is to use materials from smaller containers, where the air has less chance to enter. Even a slight amount of anti-skinning agent added to the formula can seriously affect the pattern.

19—SOURCE OF SUPPLY: In the case of wrinkle enamels, selection of a source of supply is far more important than it is with the more ordinary paints. Some paint manufacturers cook their own wrinkle resins and some others buy prepared resins and cut them with cold solvents. Still other manufacturers do not manufacture their wrinkle enamels at all, but buy them from other manufacturers. A good source is usually a manufacturer who either does the entire job himself or is in close touch with all operations covering its manufacture, and who is prepared to give good service and cooperation.

20—PART DESIGN: In some instances a wrinkle finish is called for on the inside surfaces of an assembly having an opening smaller than the smallest spray pattern. In this case, it is obvious that the area adjacent to the opening will have a surplus of

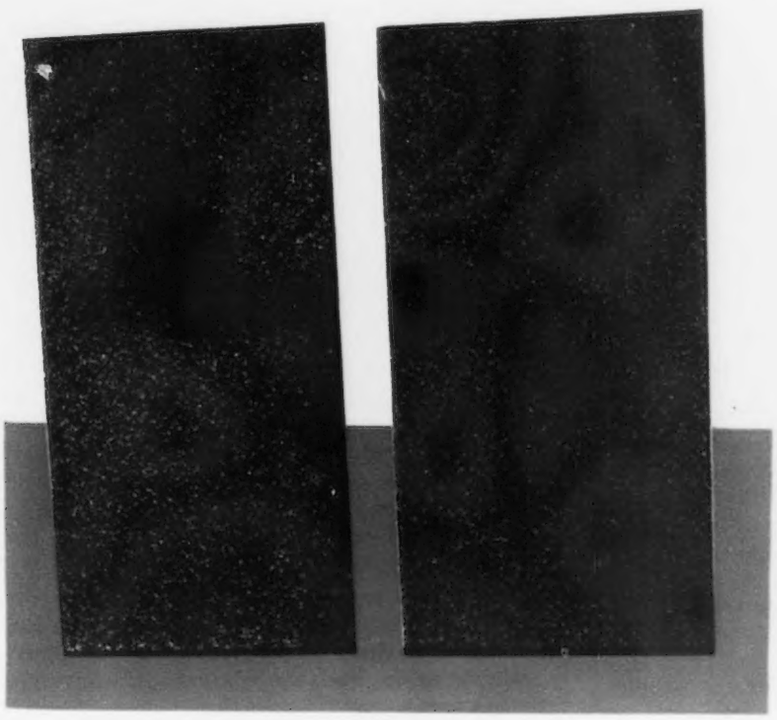


Fig. 4—In finishing brass there is a tendency for wet enamel to gather along edges and follow scratches in the metal. Good wrinkle finishes are shown here on strip steel (left) and brass (right).

paint and subsequently a different pattern. Right angle inside corners are more difficult than outside corners, because the high air pressure used with wrinkle enamels causes the air and atomized paint to swirl away from these recesses. The result is usually a variation in pattern in that area. There is no formula for wrinkle enamel which will accommodate misapplication of this type of finish to a part whose design will not accommodate it. The use of wrinkle finish should be confined to its own possibilities.

21—PAINT AGITATION: Wrinkle enamels, like any other paint, contain pigments which show some tendency to settle in the container. The pigment, being part of the finish formula, must be agitated. Agitation, in a pressure container if possible, should be confined to the time that the material is in use, as wrinkle enamels are capable of taking on air in the body from over-agitation.

22—OIL ABSORPTION: Casting surfaces are porous and are usually machined to some extent before painting. Machinery oil, used during this process, is sometimes absorbed into this porous structure. Normal cleaning processes do not always remove this oil, but it bakes out into the wrinkle enamel and causes glossy soft spots with a fine pattern or no pattern at all. Vapor degreasing of castings efficiently removes oil, but it is sometimes necessary to preheat the casting above the paint baking temperature to remove the entrapped oil.

23—SPEED OF APPLICATION: The usual coverage of wrinkle enamel by the spray method is from 100 to 150 sq ft per gal. The normal coverage of smooth coatings is approximately twice that of the wrinkle. Therefore, a greater volume of wrinkle enamel must be applied to the surface. There is a considerable difference in the final finish if this is done in one, two, three, or four gun passes over the surface. The best standard motion for wrinkles is that which requires the minimum of time.

24—APPLICATION OF LACQUER: Where several colors of finish are produced, it is advisable to use one base wrinkle enamel, followed by colored lacquers. The wrinkle enamel pattern has a top and four sides. Lacquer enamel applications must therefore be made by directing the lacquer spray in five different directions. These are, down from the top, and in from each side of the wrinkle pattern. If this is not done, one angle of view of the finished piece will not appear the same color as the other. If only one wet coat of lacquer is applied, it will show a tendency to run from the high ridges of the wrinkle pattern, exposing the base color. It is advisable to apply a mist coat of lacquer, first and then follow it with a full spray coat.

25—PATTERN SIZE: There are only two natural patterns of wrinkle formation, the extremely coarse glossy surface and the extremely fine dull surface. The former is the most difficult to control, and the latter pattern is distinguishable only at a close distance. Nearly all of the wrinkle enamels used in industry are a combination of these, and are therefore more difficult to control than the finest patterns. The gloss differences are not necessarily true gloss values, but are an illusion caused by the texture of the wrinkle.

These causes of wrinkle enamel failure are not intended to discourage the use of wrinkle enamels. However, a better knowledge of their variables affecting their application will avoid over-optimism. Several attempts have been made to establish limit standards of wrinkle enamel patterns to accommodate inspection. They showed that this can be quite successful if assembly of the wrinkle finished parts is not involved. If assembly is involved, however, it is obvious that the permissible pattern variable between coarse and fine textures in the standards themselves is less than the ordinary good production variables. Inspection against these standards only results in a high rate of rejection which, in turn, raises the already high cost of production.

When decorative finishes are being tested in the laboratory, different tests are required than those used on smooth finishes. Nearly always, tests are concentrated on material workability rather than on exposure behavior. This involves a comparison of laboratory equipment with that to be used in production. Ovens should be tested for their ability to produce like results. The remainder of the tests should be based on the characteristics of the material under consideration with regard to handling and surface variables. But even with the standards established, only the best workmen should be considered for production work.

The protective and wearing quality of a decorative finish is not much different than any good paint material. One coat of wrinkle enamel designed for direct metal contact may require the application of undercoats and fillers to obtain pattern uniformity over the surface variety. In some instances, special cleaning of the metal and even prebake cycles are necessary for greater pattern uniformity.

Probably all users of wrinkle finishes will agree that this type of decorative finishes cannot be patched successfully. When they are patched, the patch is probably always more discernible than a solid color.

Patching a baked decorative finish would normally necessitate rebaking the entire object. Portable infra-red equipment can efficiently heat the desired area to the desired temperature, but this unfortunately is not a complete solution because the baking conditions are far different than when the original finish was applied. Recoating any decorative finish wherein a pattern or texture is involved is not a practical possibility, either. In the case of wrinkle enamels, nearly twice the volume of wet material is required to produce a like pattern as was produced on the original base metal.

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The open-bank lamp variety allows more oxygen absorption, but there is no way in which top-to-bottom temperatures can be controlled. The temperature variable from top to bottom of the piece causes pattern differences in wrinkles. Also, the hammer-effect finishes are formulated to contain a quantity of bright metallic powder and are usually in light colors. Both of these factors increase the reflective value of the coating and thereby reduce the heat absorption.

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Sulfuric Resistant Wrought Stainless

DEVELOPMENT of new manufacturing methods has made possible the production of a super corrosion-resistant stainless steel, available for the first time in bar stock, wire, strip, tubing and pipe. Until the present time, this stainless steel, known as Durimet 20, has been available only in cast form, manufactured by Duriron Co., Inc.

Development of the new processes for manufacturing the material in rolled form has been announced by Carpenter Steel Co., Reading, Pa. Through an exclusive licensing arrangement with Duriron the alloy will be manufactured in new wrought forms by Carpenter.

In addition to the superior corrosion resistance provided by the alloy, called Carpenter Stainless No. 20, it retains the good mechanical properties of the 18-8 stainless steels. Because of its excellent resistance to the corrosive effects of sulfuric acid, as well as many other substances, the new material can be used extensively in the manufacture of heavy chemicals, organic chemicals, synthetic rubber, high octane gasoline, solvents, explosives, plastics and pharmaceuticals. Typical uses include pump shafts and rods, valve stems, tie rods, pipe lines, fittings, screens, etc.

The analysis of the new alloy is as follows: C, 0.07 pct max.; Mn, 0.75 pct; Si, 1.00 pct; Cr, 20.00 pct; Ni, 29.00 pct; Mo, 2.00 pct min. and, Cu, 3.00 pct min.

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A brief description of the working characteristics of the alloy is as follows:

Machinability—compares favorably with type 302 analysis
Hot forgeability—good, if properly controlled in heating
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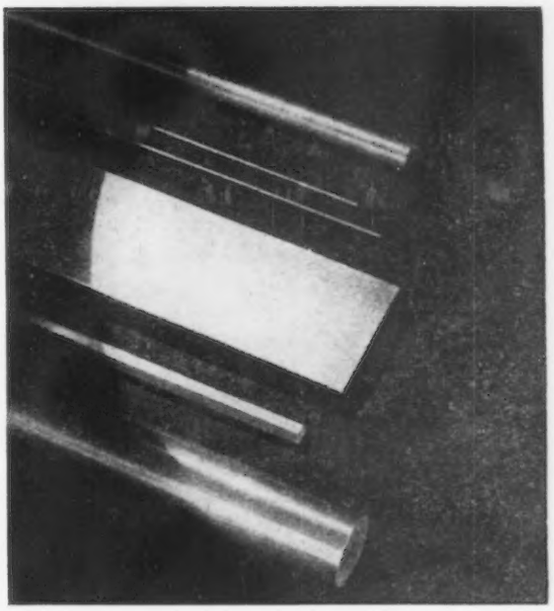
In heat treatment, it is stressed that Carpenter Stainless No. 20, like any other austenitic alloy cannot be hardened by thermal treatment. Water quenching after heating uniformly to 2100°F results in maximum corrosion resistance. Such



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In common with other austenitic alloys, the new alloy is subject to carbide precipitation when heated in (or cooled slowly through) the sensitizing temperature range. Welded structures, therefore, should be given a subsequent water quench from a temperature of 2100°F. In the case of spot welding, however, where the time element is short, a final heat treatment is not necessary. Typical properties of the alloy are given in table I.

TABLE I

Mechanical Properties of Carpenter Stainless No. 20
(1-in. round cold finished bar)

Tensile Strength	about 85,000 psi min
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Elongation (pct in 2 in.)	about 35 to 50
Reduction of Area, pct	about 50 to 70
Hardness (Bhn)	about 150 to 180

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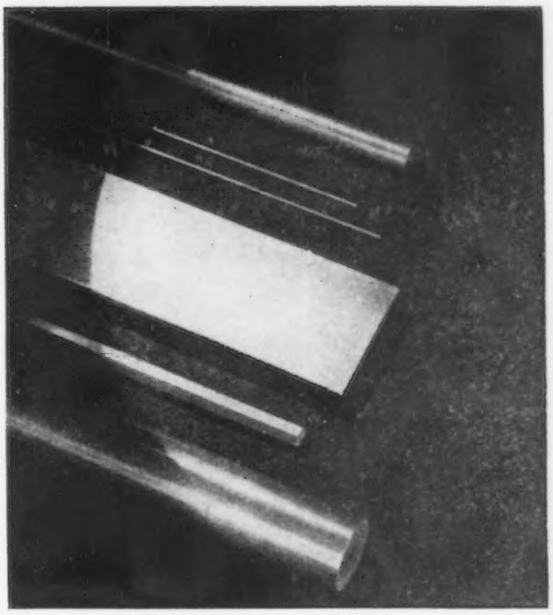

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Tensile Strength	about 85,000 psi min
Yield Strength (0.2 pct offset)	about 35,000 min
Elongation (pct in 2 in.)	about 35 to 50
Reduction of Area, pct	about 50 to 70
Hardness (Bhn)	about 150 to 180

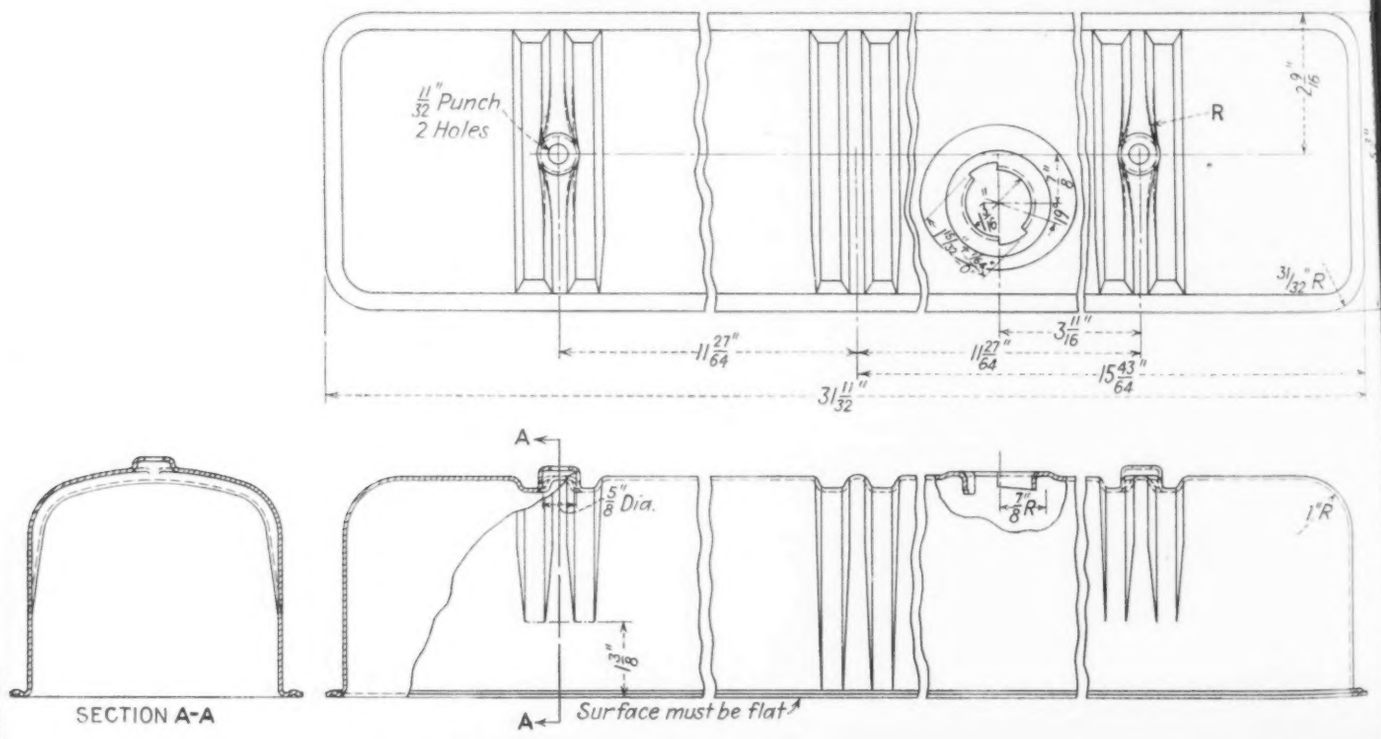
Drawing Auto Engine Rocker Arm Covers

By T. E. LLOYD
Machinery Editor,
THE IRON AGE

Mainly because of inconsistent thicknesses in purchased sheet steel, Buick has shifted from mechanical to hydraulic presses in deep drawing rocker arm covers for its engine, as described in this article. Scrap losses and reworking of these parts have been reduced to such an extent that it is now planned to produce oil pans in the same manner.

DIFFICULTIES encountered in deep drawing rocker arm covers for Buick automobile engines resulted in the recent installation by Buick Motor Div. of General Motors Corp., of a 400-ton HPM hydraulic press. As fig. 1 shows, the rocker arm cover requires a 4-in. draw. Inside dimensions are 4⅝ x 30 19/32 in. and a flange ⅝-in. wide is required around the base. There are also three pairs of cross ribs and three bosses, one of which is off center, and these tend to make the drawing job difficult, even though inside corners are well rounded.

Before the war, when steel for deep drawing could be purchased to exacting specifications, reasonably satisfactory production was achieved in a toggle press. But with current steel supply, involving considerable variations in blank thickness, scrap from the draw operation in this mechanical press ran 8 to 10 per cent and about 20 per cent of the usable drawn parts required repairs to make them serviceable. Furthermore,



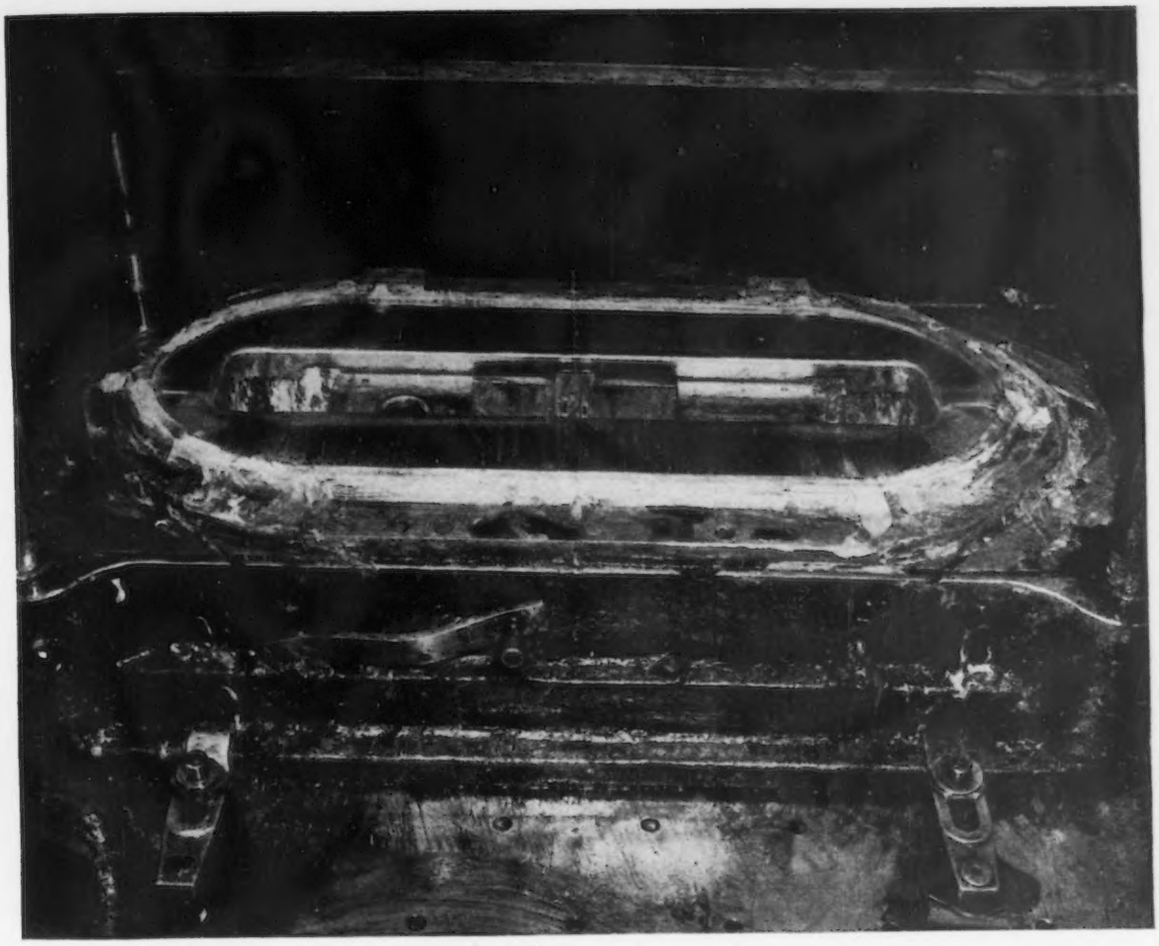


FIG. 2—This closeup of the lower half of the draw die shows the deep cavity with rib and boss forming parts. The die shears the blank to its roughly elliptical shape just before the drawing operation takes place.

some drawn parts that passed visual inspection were found later to have small porous spots that resulted in oil seepage at the ends of the cover.

Scrap and need for repairs were caused in part by variations in stock thickness. On the mechanical press, blanks that were too thin tended to pull in for lack of adequate pressure on the blank holder. When blanks were too thick, the blank holder pressure was too great and blanks broke.

With the hydraulic press, the pressure of the blank holder remains uniform regardless of variation in sheet thickness because it is dependent only upon a controlled and uniform hydraulic pressure. Variations as much as 0.010 in. either way from the 0.042 in. sheet stock thickness specified occur without apparent effect upon the drawn parts produced.

It has even been found possible to draw two 0.020-in. blanks in the same stroke and this is being given consideration for future production because the use of two pieces of this thickness in place of one 0.042-in. thick yields a composite that is favorable in its tendency to reduce the transmission of valve noise to points outside the cover.

A second factor contributing to successful and efficient drawing in the hydraulic press is the steady and uniform pressure applied by the punch traveling at a uniform speed after rapid traverse into contact with the work. This is in marked contrast to the action of a mechanical press in which, of course, both the speed and pressure applied vary constantly as drawing proceeds.

Fig. 2 shows a close-up of the lower half of the die employed for drawing the rocker arm

o o o

FIG. 1—Despite the deep draw and the need for ribs and bosses, this sheet steel rocker arm cover for Buick engines, shown here and on the opposite page, is produced with remarkably low scrap loss in an hydraulic press.

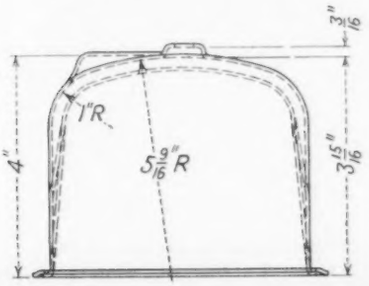


FIG. 3—A drawn rocker arm cover is shown here just after ejection from the die cavity. The helper on the far side removes the part and flash and the operator (right) feeds a new sheet large enough to produce two blanks. Lubricant is brushed on by a second helper who also assists in feeding.

cover and fig. 3 shows a drawn part as it is ejected from the die and is about to be removed by the helper on the far side of the press. The operator is about to feed a new sheet of stock onto which a second helper, not shown, has brushed lubricant. The sheet used in this instance makes two blanks.

The operator feeds the stock and then presses the control buttons which start the press cycle. As the upper die with the blank holder descends, a blank is first cut and then is immediately drawn. On the return stroke, after the blank holder has been released, an automatically timed knockout ejects the drawn part and it is lifted out by the helper who also removes the flash from the blanking operation. The press is then ready for its next cycle.

Although the draw stroke is slower and more gradual than on a mechanical press, this is favorable rather than unfavorable because there is time for the metal to flow without rupturing and production is far from being slow. Most of the cycle time, in fact, is dependent upon manual operations in shifting the blanks into place, removing the drawn part and withdrawing the flash. Production currently runs about 250 drawn parts an hour.

It is now planned to nearly double this rate by providing automatic feed rolls, using coiled stock, with spray guns applying draw lubricant. This will reduce from three to two the number of men needed and will require less manual labor by the press operator who will merely operate button controls and check the feeding of stock. The latter will not require shearing into sheets and will save labor on that score. It is anticipated that the changes in feeding will enable the press to produce up to about 450 drawn covers an hour.

Following removal from the hydraulic press, the drawn parts go to mechanical press dies which produce a radius of smaller curvature next to the flange, form the latter at some points and trim the flange to final size.

Because of the success attained and the substantial savings that result from reduced scrap and from elimination of repairs on the drawn covers, more extensive use of hydraulic presses is being considered. For example, the Buick engine oil pans which are much larger parts and require deeper draws, may be transferred to hydraulic presses. Similar economies are anticipated for much the same reasons, even though the shape of the drawn oil pan differs substantially from that of the rocker arm cover.

The Iron Age Metalworking Buyers' Guide

. . . A third section of the Buyers' Guide is presented herewith. The first section of this directory appeared in the Annual Review Issue, Jan. 1, 1948, p. 208. This guide has been developed to give executives and purchasing agents of the metalworking industry a directory with a much finer breakdown in classifications than has been heretofore available. Additional sections of the guide will be published weekly.

—B—

(CONTINUED)

Belts, Felt, Polishing (See Felt Polishing Belts)

Belts, Rubber

Cincinnati Rubber Mfg. Co., Franklin Ave., Cincinnati 12.

Quaker Rubber Corp., Comly & Milner Sts., Philadelphia 24.

Belts, Safety

Buhrke, R. H., Co., 4700 W. Grand Ave., Chicago.

Mine Safety Appliance Co., Braddock, Thomas & Meade Sts., Pittsburgh.

Belts, V-Type

Dayton Rubber Mfg. Co., 2345 Riverview Ave., Dayton 1.

Dodge Manufacturing Corp., Mishawaka, Ind.

Benders, Pipe, Tube, Conduit, Hand

Greenlee Tool Co., Columbia Ave., Rockford, Ill.

Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7.

Kane & Roach Inc., Syracuse, N. Y.

Toledo Pipe Threading Co., Summit St., Toledo.

Bending Machines

American Pipe Bending Machine Co., 20 Furnace Street, Poultney, Vt.

Bertsch & Co., Cambridge City, Ind.

Blackhawk Mfg. Co., 54th & Rogers Sts., Milwaukee 1.

Botwinik Bros. of Mass., Inc. (New and Used), 5 Sherman St., Worcester 1.

Cleveland Punch & Shear Works Co., 3929 St. Clair Ave., N. E., Cleveland 14.

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.

Donahue Steel Products Co., Inc., 1919 W. 74th St., Chicago 36.

Excelsior Tool & Machine Co., 30th to Ridge to Jefferson Ave., East St. Louis, Ill.

Galbreath Machinery Co. (Used), Empire Bldg., Pittsburgh.

General Machinery Corp., Hooven, Owens, Rentschler Div., Hamilton, Ohio.

General Mfg. Co., 6430 Farnsworth Ave., Detroit 11.

Hendley & Whittemore Co., Beloit, Wis.

Interstate Machinery Co., 1435 W. Pershing Rd., Chicago 9.

James Knights Co., Sandwich, Ill.

Kling Bros. Engineering Wks., 1330 N. Kostner Ave., Chicago 51.

Lake Erie Engineering Corp., Buffalo 17.

Machinery Liquidating Co., 2306 W. Warren Ave., Detroit 8.

O'Neil-Irwin Mfg. Co., 316 Eight Ave., So., Minneapolis 15.

Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40.

Ritterbush & Co., Inc., 50 Church St., New York 7.

Simmons Machine Tool Corp., Albany 1.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Tal Prestal Bender, Inc., 417 N. Water St., Milwaukee.

United States Steel Supply Co., 1319 Wabansia Ave., Chicago 90.

Williams, White & Co., 8th St. & Third Ave., Moline, Ill.

Wood, R. D., Co., Conshohocken, Pa.

Beryllium Copper

American Brass Company, Waterbury 88, Conn.

Ampco Metal, Inc., 1745 So. 38th St., Milwaukee.

Commerce Pattern Foundry & Machine Co., 7450 Melville at Green, Detroit 17.

Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6.

Riverside Metal Co., Keystone Bldg., Riverside, N. J.

Weiger Weed & Co., 11644 Cloverdale Ave., Detroit 4.

Billets, Stainless Steel

American Rolling Mill Co., Middletown, Ohio.

Bethlehem Steel Co., Bethlehem, Pa.

Carnegie-Illinois Steel Corp., Carnegie Bldg., 434 5th Ave., Pittsburgh 30, Pa.

Carpenter Steel Co., 321 W. Bern St., Reading, Pa.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32, Ill.

Crucible Steel Co. of America, Chrysler Bldg., New York 17.

Glazer Steel Corp., 2103 Ailor Ave., Knoxville, Tenn.

Heppenstall Co., Hatfield St., Pittsburgh 1, Pa.

Hoyland Steel Co. Inc., 405 Lexington Ave., New York 17, N. Y.

Jessop Steel Co., Washington, Pa.

Jorgenson Co., Earle M., Box 2358, Terminal Annex, Los Angeles 54, Calif.

Rustless Iron & Steel Div. The American Rolling Mill Co., 3400 E. Chase St., Baltimore 13, Md.

Timken Roller Bearing Co., Canton 6, Ohio.

Billets, Steel, Iron

Ajax Steel & Forge Co., 205 Adair St., Detroit 7, Mich.

Alan Wood Steel Co., Conshohocken, Pa. . .

Bethlehem Steel Co., Bethlehem, Pa.

Carnegie-Illinois Steel Corp., Carnegie Bldg., 434 5th Ave., Pittsburgh 30.

Carpenter Steel Co., 321 W. Bern St., Reading, Pa.

S. Cheney & Son, Manlius, N. Y.

Glazer Steel Corp., 2103 Ailor Ave., Knoxville, Tenn.

Harrisburg Steel Corp., Simpson St., Harrisburg, Pa.

Heppenstall Co., Hatfield St., Pittsburgh 1.

Hoyland Steel Co. Inc., 405 Lexington Ave., New York 17, N. Y.

Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.

Jessop Steel Co., Washington, Pa.

Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Third Ave. & Ross St., Pittsburgh 30, Pa.

Jorgenson Co., Earle M., Box 2358, Terminal Annex, Los Angeles 54, Calif.

Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.

National Forge & Ordnance Co., Irvine, Warren Co., Pa.

Republic Steel Corp., Republic Bldg., Cleveland 1.

Swedish American Steel Corp., 433 Kent Ave., Brooklyn 11, N. Y.

Timken Roller Bearing Co., Canton 6, Ohio.

United States Steel Supply Co., 1319 Wabansia Ave., Chicago 90, Ill.

Wheelock-Lovejoy & Co., Inc., 128-138 Sidney St., Cambridge 39, Mass.

Billets, Tool and Special Analysis

Colonial Steel Division, Vanadium-Alloys Steel Co., Latrobe, Pa.

Crucible Steel Co. of America, Chrysler Bldg., New York 17.

Bimetals, Thermostatic

Brainin, C. S., Co., 233 Spring St., New York.

Chace, W. M., Co., 1600 Beard Ave., Detroit.

Sherman & Co., 196 Canal St., New York 13, N. Y.

Bins and Bunkers (See also Storage Bins and Racks)

Factory Service Co., 4600 N. 21st St., Milwaukee 9.

McCrosky Tool Corp., Meadville, Pa.

Bismuth

Belmont Smelting & Refining Works, Inc., 330 Belmont Ave., Brooklyn 7.

Michigan Smelting & Refining Div., Bohn Aluminum & Brass Corp., 7900 Jos. Campau Ave., Detroit.

U. S. Smelting, Refining & Mining Co., 80 Federal St., Boston.

Bits, Tool (See Tool Bits, High Speed)

Bits, Track

Whitman & Barnes, Div. of United Drill & Tool Corp., Detroit 16, Mich.

Blackening Processes, Copper

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Mitchell-Bradford Chemical Co., 2446 Main St., Stratford P.O., Bridgeport, Conn.

Technic Inc., 39 Snow St., Providence 3.

U. S. Galvanizing & Plating Equipment Corp., 27-41 Heyward St., Brooklyn 11.

Blackening Processes, Steel

Beam-Knodel Co., 195 Lafayette St., New York 12.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Mitchell-Bradford Chemical Co., 2446 Main St., Stratford Post Office, Bridgeport, Conn.

Puritan Mfg. Co., Waterbury, Conn.

Sommers Bros. Mfg. Co., 3439-41-43 No. Broadway, St. Louis 7.

Technic Inc., 39 Snow St., Providence 3.

U. S. Galvanizing & Plating Equipment Corp., 27-41 Heyward St., Brooklyn 11.

Blackening Processes, Zinc

Mitchell-Bradford Chemical Co., 2446 Main St., Stratford Post Office, Bridgeport, Conn.

Puritan Mfg. Co., Waterbury, Conn.

Sommers Bros. Mfg. Co., 3439-41-43 No. Broadway, St. Louis 7.

Technic Inc., 39 Snow St., Providence 3.

United Chromium Inc., 51 East 42nd St., New York 17.

U. S. Galvanizing & Plating Equipment Corp., 27-41 Heyward St., Brooklyn 11, N. Y.

Black Plate (See Plate, Black)

Blast Cleaning Equipment

American Foundry Eqpt. Co. Inc., 412 S. Byrkit St., Mishawaka, Ind.

American Wheelabrator & Eqpt. Corp., 412 Byrkit Ave., Mishawaka, Ind.

Dreisbach Engineering Corp., 85 Warburton Ave., Yonkers 2, N. Y.

Hydro-Blast Corp., 2550 N. Western Ave. cor. Logan Blvd., Chicago 47.

Pangborn Corp., Pangborn Blvd., Hagerstown, Md.

Parsons Engineering Corp., 2549 E. 79th St., Cleveland 4.

Stoody Co., 1149 W. Slauson Ave., Whittier, Cal.

Blasting Equipment, Abrasive (See Abrasive Blasting Equipment)

Blasting Equipment, Hydraulic

Hydro-Blast Corp., 2550 N. Western Ave. cor. Logan Blvd., Chicago 47.

Blasting Helmets (See Helmets, Blasting)

Blowers

Allis-Chalmers Mfg. Co., Milwaukee 1.

American Blower Corp., 6000 Russell St., Detroit 11.

Botwinik Bros. of Mass., Inc., 5 Sherman St., Worcester 1, Mass.
New & Used

Champion Blower & Forge Co., Harrisburg Ave., Lancaster, Pa.

Delco Appliance Div., General Motors Corp., 391 Lyell Ave., Rochester 1, N. Y.

Donahue Steel Products Co. Inc., 1919 W. 74th St., Chicago 36.

Electric Vacuum Cleaner Div., General Electric Co., 1734 Ivanhoe Rd., Cleveland 10.

Falstrom Co., Main Ave. & D. L. & W. R. R., Passaic, N. J.

A. Mandel & Co., 37 E. 12th St., New York 3.

Michiana Products Corp., Michigan City, Ind.

Milwaukee Metal Spinning Co., 4122 W. State St., Milwaukee 8.

Parsons Engineering Corp., 2549 E. 79th St., Cleveland 4.

Wanted:

Corrections for Buyers' Guide

• Every company in the metalworking industry is urged to check this and subsequent sections of the new Iron Age Metalworking Buyers' Guide, and promptly send in all necessary corrections and additions to assure complete accuracy in the first reprint of the directory. Corrections should be sent to THE IRON AGE, Attention Buyers' Directory, 100 E. 42nd St., New York 17.

Perkins, B. F., & Son, Inc., Chicopee St., Holyoke, Mass.

Redmond Co. Inc., Owosso, Mich.

Robinson Ventilating Co., Zelienople, Pa.

Roots-Connersville Blower Corp., Connersville, Ind.

St. Louis Blow Pipe & Heater Co., Inc., 1948-60 N. 9th St., St. Louis 6.

Torit Mfg. Co., Walnut & Exchange Sts., St. Paul 2.

Trane Co., La Crosse, Wis.

Westinghouse Electric Corp., 1st National Bank Bldg., Pittsburgh 22.

Blowers, Portable, Electric

Ace Co., Ocala, Fla.

American Blower Corp., 6000 Russell St., Detroit.

Breuer Electric Mfg. Co., 5100 N. Ravenswood Ave., Chicago 40.

Clements Mfg. Co., S. Narragansett Ave., Chicago 38.

Utility Appliance Corp., 49th & Alameda, Los Angeles.

Blowers, Turbo

Allen Billmyre Co., 431 Fayette Ave., Mamaroneck, N. Y.

Allis-Chalmers Mfg. Co., 1126 So. 70th St., Milwaukee 1.

Botwinik Bros. of Mass., Inc. (New & Used), 5 Sherman St., Worcester 1, Mass.

DeLaval Steam Turbine Co., Trenton 2, N. J.

Dempsey Industrial Furnace Corp., Mill River Lane, Springfield 1, Mass.

Donahue Steel Products Co., Inc., 1919 W. 74th St., Chicago 36.

Ingersoll-Rand Co., New York 4.

Mahr Mfg. Co., Div. Diamond Iron Works, 1729 No. 2nd St., Minneapolis 11.

Mid Continent Metal Products Co., 1960 N. Clybourn Ave., Chicago 14.

Milwaukee Metal Spinning Co., 4122 W. State St., Milwaukee 8.

North American Mfg. Co., 2910 E. 75th St., Cleveland 4.

Robinson Ventilating Co., Zelienople, Pa.

Roots-Connersville Blower Corp., Connersville, Ind.

F. A. Smith Mfg. Co., Davis & Augusta Sts., Rochester 2, N. Y.

Spencer Turbine Co., 497 New Park Ave., Hartford 6, Conn.

United States Hoffman Machinery Corp., 105 Fourth Ave., New York 5.

Vapofier Corp., 10316 South Throop St., Chicago 43.

Westinghouse Electric Corp., 1st National Bank Bldg., Pittsburgh 22.

Blow-Off Systems, Continuous

Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32.

Young & Bertke Co., Hulbert Ave., Cincinnati 14.

Blowpipes

Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7.

Johnson Gas Appliance Co., Cedar Rapids, Ia.

Parsons Engineering Corp., 2549 E. 79th St., Cleveland 4.

Torit Mfg. Co., Walnut & Exchange Sts., St. Paul 2.

Blowpipes, Oxyacetylene, Welding and Cutting

Air Reduction Sales Co., 60 East 42nd St., New York 17.

Dockson Corp., 3839 Wabash Ave., Detroit 8.

General Welding & Equipment Co., 268 Northampton St., Boston 18.

The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7.

Linde Air Products Co., 30 E. 42nd St., New York 17.

Modern Engineering Co., 3409 Pine Blvd., St. Louis 3.

National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6.

Rall Supply Co., 110 E. 42nd St., New York 17.

Blow Pipe Systems

Parsons Engineering Corp., 2549 E. 79th St., Cleveland 4.

St. Louis Blow Pipe & Heater Co. Inc., 1948-60 N. 9th St., St. Louis 6.

Blueprinting Machines

Ozalid Products Div., General Aniline & Film Corp., 1500 Ansco Rd., Johnson City, N. Y.

Boards, Drop Hammer

Detroit Drop Hammer Board Co., 510 St. Jean St., Detroit.

Irwin Manufacturing Co., Inc., Garland, Pa.

Woodcraft Corp., Bay City, Mich.

Boilers, Steam, Electroplating and Pickling Tanks

Babcock & Wilcox Co., 85 Liberty St., New York.

Kennedy-Van Saun Mfg. Corp., Danville, Pa.

Milwaukee Metal Spinning Co., 4122 W. State St., Milwaukee 8.

H. B. Smith Co., Inc., Westfield, Mass.

Boilers, Steam, Watertube and Firetube

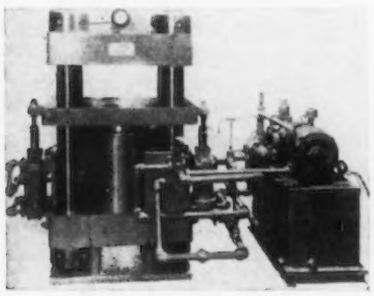
(CONTINUED ON PAGE 129)

New Equipment . . .

A 400-ton hydraulic die-hobbing press, a tube mill for converting strip into standard weight pipe, a diecasting machine with 2 lb capacity for both zinc and aluminum, and an automatic tool sharpener are presented this week, as well as ac arc welders, a notcher which cuts a 90° notch. A recirculating furnace featuring reverse flow, electric truck attachments, and various small tools.

Die Hobbing Press

A 400-ton hydraulic die-hobbing press has been announced by the *Edward Franklin Schill Corp.*, 39 Cortlandt St., New York 7. This is a four rod type press having an upmoving ram, with a stroke of 6½ in; daylight opening of 12 in., with a clearance between strain rods 22 in. right and left x 8 in. front to back. Stroke control is from ¾ in. to full stroke of 6½ in; pressure control up to 400 ton capacity of press. The hydraulic unit is operated by a 7½-hp motor. A low pressure pump and high pressure booster are included in



the design. Retraction is 2 pull-backs, under low pressure only. The press is manually operated with a free closing speed of 75 ipm and 150 ipm opening speed.

Tube Mill

DEVELOPMENT of a mill for converting strip into standard weight pipe with diameter sizes ranging from ½ to 2 in. has been announced by *American Electric Fusion Corp.*, 2600 Diversey Ave., Chicago 47. The mill transforms coils of flat strip into electrically welded pipe at speeds up to 65 fpm, depending on diameter. The pipe is formed, welded, scarfed, sized, straightened and cut to length in one continuous automatic operation. It is claimed the finished pipe possesses the same strength and qualities as the original strip from which it is formed, and the

welded seam is stronger than the parent metal. This butt welded tubing is cold formed over rolls and is resistance welded.

Diecasting Machine

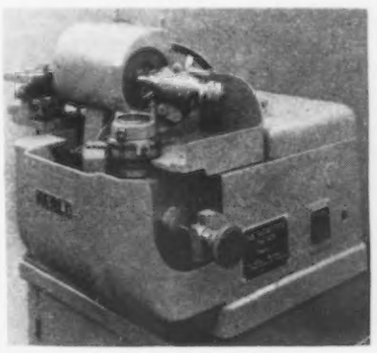
KNOWN as the Two-Pounder, a diecasting machine announced by *DCMT Sales Corp.*, 315 Broadway, New York, is rated at 350 shots per hr for both zinc and aluminum. Changeover from zinc to aluminum diecasting can be made without the use of the hand ladle for each shot in aluminum. Capacity is 2 lb on zinc and 1 lb on aluminum, on 12x18-in. standard die blocks. As there are no tie bars through the die blocks, all four sides are left open for core pulls or placement of inserts. The die carrier slides on dovetail ways. This machine is pneumatically operated and controlled from one toggle switch.

Aluminum Casting Alloy

DEVELOPMENT of an aluminum casting alloy, called Tenzaloy, has been announced by *Federated Metals Div., American Smelting & Refining Co.*, 19 Nassau St., New York. This alloy is said to produce castings of high strength and hardness without the necessity for heat treatment. Nominal composition of Tenzaloy is 0.8 pct copper, 0.4 pct magnesium, 8.0 pct zinc and balance aluminum. Other advantages are machinability, corrosion resistance, and extreme whiteness. It is reported that Tenzaloy is readily cast with standard foundry procedure and equipment into sand, plaster, or permanent molds.

Tool Sharpener

COMPLEMENTING the Bore-Matic line manufactured by *Heald Machine Co.*, Worcester 6, Mass., is the Model 2 tool sharpening machine, designed to lap

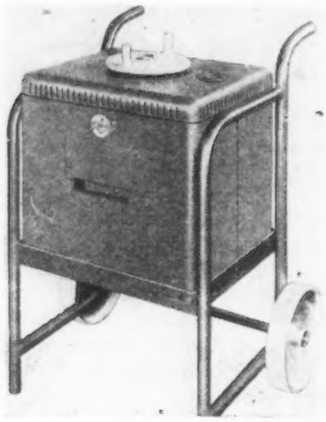


edges to the correct shapes. This is accomplished automatically. Accurate adjustment for any desired shape of tool can be made after which the operator has merely to insert the tool in the holder, turn on the switch and the tool is sharpened automatically. The sharpener can be provided with a coarse wheel for roughing tool surfaces preliminary to finish grinding. Odd shaped tools can be finished on an off-hand grinding attachment using fine-grit diamond wheel.

AC Arc Welders

AC welders including three industrial models of 200, 300 and 400 amp and two models for

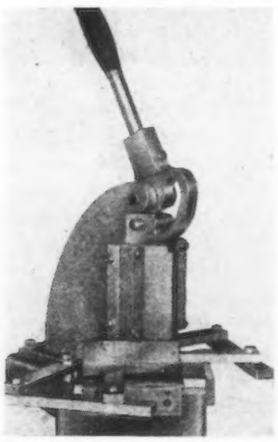
general shop use of 130 and 180 amp have been developed by *John A. Kern Co.*, 224 N. Loomis St., Chicago 7. A movable core on all models travels less than 1 in. to



cover the range of stepless amperage control. Patented electrical and magnetic circuits which result in an instant starting at all amperage settings are one of the features of all models. Compactness is due to the movable core which travels less than 1 in. to cover the entire range of stepless amperage control. The arrangement of dual primary and secondary coils and the elimination of arc boosters, reactor coils and fans also contribute to the compact design. Cooling is provided by air passages around coils and cores.

Notcher

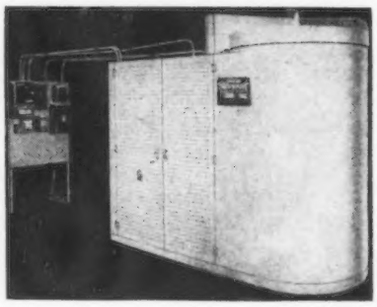
THE Di-Acro notcher announced by the *O'Neil-Irwin Mfg. Co.*, Lake City, Minn., is a precision



shearing unit which cuts a 90° notch of any size, within the capacity of the machine, in one operation either at the corner or in any position along the edge of sheet material. It is also possible to shear angles both smaller and greater than 90°. A flexible gaging arrangement built into the notcher allows a notch of any dimension desired to be exactingly located, it is reported. Cutting range of the machine extends from the lightest of materials in plastics, fiber, etc. to heavy gages of aluminum, cobalt steel, chrome molybdenum, leaded brass and stainless steel. Maximum 90° notch measures 6 x 6 in. and material capacity is 16 gage steel plate.

Recirculating Furnace

FEATURING reverse flow of gases through the work at regular intervals by means of a damper arrangement giving any reversing cycle desired, a recirculating furnace has been developed by *Sunbeam - Stewart Industrial Furnace Div., Sunbeam Corp.*, 4405 Ogden Ave., Chicago 23. The furnace is applicable to the heat treat-



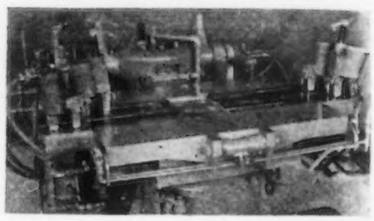
ment of any high stress parts, such as aircraft landing gears, valve springs, cam shafts, coil springs, etc. The reversing cycle timer is adjustable from 30 sec to 5 min. The fan, which is made of cast, heat resisting alloys, has a capacity of 4800 cfm. The door lift may be air or hydraulic, hand or foot valve, or electric switch. Maximum temperature is 1250°F.

Refractory Coating

A REFRACTORY coating developed to prevent spalling action, resist heat penetration and to decrease carbon, slag and clinker adherence in fire boxes, furnaces and crucibles, has been announced by *Whitman Co.*, 1407 Esperanza St., Los Angeles 23. The coating, called Vitroseal, forms a semiglazed protective monolithic wall between fire and the fire brick and is said to be impervious to heats up to 3390°F. Vitroseal's glazed coating is said to speed heat-up time due to reflection and decreases heat loss through joints. The coating is applied by either brush or spray.

Air-Operated Clamp

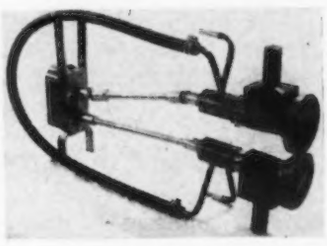
DEVELOPMENT of a double air-operated clamp for use with rollover machines has been announced by *Tabor Mfg. Co.*,



6225 Tacony St., Philadelphia. The tool is said to be of particular interest as time savers to foundry jobbing shops and certain classes of work in production plants. When frequent changes of pattern boards or core boxes have to be made, they are placed on the rollover table in an approximate central position; the two lower clamps are slid into clamping position against the ends of the board or box and the air turned on, firmly locking them in position throughout the run. Bottom boards are clamped in the same manner. It is reported that operations which formerly required from 5 to 10 min, take about that many seconds with the new clamp.

Seam Weld Attachment

FOR the job shop or manufacturer whose operations involve occasional seam welding operations, *Electrical Maintenance & Engineering Co.*, 12525 Euclid Ave., Cleveland 12, has made available an attachment which may be installed

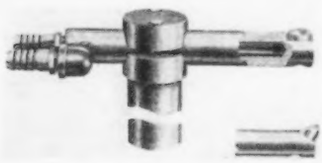


on any rocker arm type spot welder, either foot or air operated, from 10 to 50 kva. After the seam weld work is done the welder may be changed back to spot weld duty by loosening the electrode holding screws, removing the seam weld heads and back gears, and inserting the spot weld electrodes. The motor.

drive, and speed reducer are left on the machine during spot welding operations. Change time is said to be about 15 min. Welding shafts and wheels are internally cooled. Continuous welds from No. 18 to No. 28 gage may be made. Where the continuous weld is used all day the gage should be No. 22 or lighter. Speed of welding may be varied in 7 steps from 3 to 15 fpm.

Electrode Holder

ANNOUNCEMENT of a water-cooled light duty holder for resistance welding electrodes has been made by *P. R. Mallory Co., Inc.*, Indianapolis 6. The holder incorporates a button-type replaceable electrode held in place by a set screw. Approximately 4 in. of



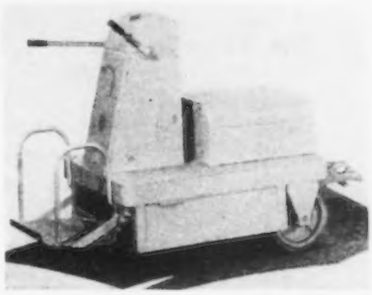
offset adjustment is made available by setting the minimum amount of offset desired and setting two bolts in the T connection head. Shank length is 3 in. with diameters of ¾, ⅞, 1, and 1¼ in. The holder is made from Mallory 3 metal bar stock.

Hard Surfacing Electrode

TOOLWELD A & O is an electrode marketed by *Lincoln Electric Co.*, Cleveland 1, for hard surfacing tools and dies in building up the working surfaces or edges of cold-working metal cutting and forming tools. It is said to produce surfaces of high strength for resisting wear and impact in all applications where high temperatures are not encountered. The deposited metal is of the 5 pct chromium type and may be used as welded or subjected to heat treatment. Successful applications are said to include welds on blanking, forming, die-casting dies, upsetter dies and punches, forming rolls, burnishing tools, centerless grinder rests, planer ways, flash shearing dies and punches. The electrode is designed for operation on either ac or dc current, electrode negative with dc. It is said to deposit a thick bead in one pass in the low current portion of the operating range, and a thin bead in the high current portion of the range.

Electric Tow Unit

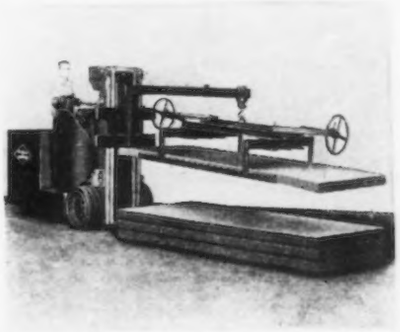
SUITED for towing jobs where maneuverability is a primary factor, an electric tow unit having a turning radius of 72 in., making it possible to turn into a 62 in. aisle, has been manufactured by



Rocky Mountain Steel Products, Inc., 1360 Wall St., Los Angeles 15. It is capable of hauling 10,000 lb of trailer loads and its light weight permits its use in elevators. The operator of this stand-up tow unit can face in either direction. Wheelbase is 30 in.; overall dimension, including hitch, 75 in.; and it is equipped with either a 24v or 32v battery providing speeds of 6 or 8½ miles per hr respectively.

Plate and Sheet Handler

THE problem of handling long sheets of steel in or out of freight cars has been facilitated by means of a steel plate and sheet handler developed as accessory equipment for fork type electric power industrial trucks, *Elwell-Parker Electric Co.*, Cleveland 1, has announced. It is reported that



an electric truck, normally handling 6000 lb at 24 in. in front of the uprights, will handle a 3000 lb load of 8x4 ft or 2000 lb of 10 x 4 ft lengthwise, including weight of accessory, or 6000 lb of 8 x 4 ft or 10 x 4 ft crosswise the truck. The truck has forward and backward tilt; the latter to stabilize the load when traveling, since the near end of the load rests against the uprights. The truck is furnished with telescoping uprights so that it may enter a boxcar and yet stack steel 6 to 10 ft high. One inch dunnage strips between unit loads facilitate the insertion of lifting lip of the suspended clamp-grab. The grab has 24 in. adjustment for widths and is 84 in. long. The truck travels at 400 fpm and elevates at 12 to 22 fpm.

Scaling Hammer

FOR applications such as removing weld flux and spatter, scaling paint, removing rust, removing fins from castings, peening, chipping, and star drilling, *Rotor Tool Co.*, 17325 Euclid Ave., Cleveland,

has announced the S-1 scaling hammer. The tool features a graduated control in the throttle which gives a choice of blows delivered. Pressure on the valve determines power delivered. An exhaust cleans the work. The chisel is removed from the holder by thumb pressure. Chisels are furnished in blank, flat, or spoon form and star drills in sizes from 3/16 to ¾ in. Weight is 3 lb; length without chisel is 10¼ in.

Moisture Meter

A DEVICE for measuring moisture content of air and gases at approximately atmospheric pressure has been placed on the market by *Pittsburgh Lectrodryer Corp.*, P.O. Box 1766, Pittsburgh 30. The apparatus consists of an outer container with inlet and outlet connections and a glass window; an inner container; and a thermometer. To determine the dewpoint temperature, a small sample of the gas to be tested is passed through the outer container while a mixture of crushed dry ice and acetone is stirred in the inner container. Stirring is done with the thermometer. Dew or moisture is observed on the polished surface of the inner

container and temperature is read from the thermometer. Dewpoints as low as approximately −169°F may be checked, according to the manufacturer.

Anode Hooks

DEVELOPMENT of cast copper anode hooks has been announced by *Division Lead Co.*, 836 W. Kinzie St., Chicago 22. Used on

Divco 71-point lead anodes, the cast copper hooks are said to double the current carrying capacity, increasing the efficiency made possible by the 71 throwing edges. The cast design retains the special shape which facilitates handling.

Offset Strainer

AN offset sinlex strainer has been developed by *J. A. Zurn Mfg. Co.*, Erie, Pa., to permit the strainer to be completely drained as the line itself is drained. With the inlet and outlet at right angles, the unit can be installed to form a right angle connection in a piping system. The basket and basket chamber can be made to any length, depending upon the amount of entrainment in the stream. The cover is removable. Strainers are made in cast bronze, steel, semi-steel, iron, or alloyed metals for corrosion resistance. Types are available for working pressures from 125 to 300 lb in sizes from 1½ to 12 in. flanged, screwed, or welding connections.

Carbide Tipped Drills

FOR shops requiring tools to drill holes in dies and fixtures after the metal has been hardened, *Super Tool Co.*, 21650 Hoover Road, Detroit, has made available a line of standard carbide tipped drills stocked in 10 sizes ranging from 3/16 to ¾ in. The drills can be used either dry or with coolant and are suitable for deep hole drilling regardless of Rockwell hardness, according to the manufacturer.

Flexible Shaft Machine

THE Rotoflex, a four-speed gear drive flexible shaft machine which is described as employing a new type of quick change gear drive has been designed by *N. A. Strand & Co.*, 5001 N. Wolcott Ave., Chicago 40. This unit features two sets of helical cut hardened steel gears running in lubrication. By means of an eccentric driving shaft sleeve assembly, one or more master gears may be engaged by a slight rotary motion as well as axial move-

ment of sleeve for several different speeds. Driving unit consists of an enclosed motor, enclosed gear housing operating in oil with a switch which is also enclosed. Machines having speeds of 850, 1800, 3600 and 4500 rpm are available. High speed machines using a 3450 rpm electric motor have speeds of 1700, 3600, 7200 and 9000 rpm.

Carbon Determinator

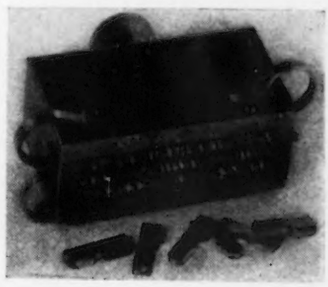
A NEW hi-precision carbon determinator, announced by *Harry W. Dietert Co.*, 9330 Roselawn Ave., Detroit 4, is said to be a product of simplification and redesign whereby improved operating conditions, reliability, and high precision of carbon analysis is obtained. Errors due to temperature changes during analysis are eliminated, it is claimed. A combustion gas cooler insures that the gases enter the burette at room temperature. A one piece burette-absorber design prevents any temperature difference between the burette and absorber. Compensation for atmospheric pressure is automatic; leveling off remains easy and accurate. A single operation returns the absorbing liquid to an exact starting point and brings the burette to atmospheric pressure for final reading. Burettes are available in several ranges for use with cast iron, steel, low carbon alloys, and organic materials.

Hydraulic Pump

ANNOUNCEMENT of the Model J adjustable volume vane type oil hydraulic pump designed for use where space is limited has been made by *Racine Tool & Machine Co.*, Racine, Wis. It is stated the unit can be installed in an area 6x6 in. Volumetric output is controlled by a mechanical movement of the motor ring. Horsepower requirements may be computed for any given installation according to volume and pressure required. Steel vanes have been designed to compensate for wear. Rotor shaft is mounted in antifriction bearings. Pump is self-lubricated and is available with foot or flange mounting.

Straight-Line Stamp

FEATURING interchangeable lines of type, a device for multiple straight-line stamping of letters and figures has been developed by *New Method Steel Stamps, Inc.*,



147 Jos Campau, Detroit 7. With the marker, instructions for use of tools, nameplates, and other information can be machine-stamped in a single operation. The individual type, which is slotted, is set into the holder and a flat locking pin holds in place the entire row of monotype and spacing slugs. The device can be used either in mechanical marking machines or in a variety of punch presses.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N-A-X
HIGH-TENSILE STEEL
HIGH STRENGTH
FINER GRAIN STRUCTURE
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Assembly Line . . .

WALTER G. PATTON

• Thompson Products analyzes "The Second Age of Flight" . . . Chrysler production passes the million mark . . . Olds starts assembling its 1948 models.

DETROIT — Man-made "Comets" are coming faster than you think!

The truth of this statement is clearly demonstrated in a small reference booklet for the annual Thompson Products Aviation calendar for 1948 prepared by A. F. Colwell, vice-president.

Bearing the title, "The New Power," the booklet summarizes the fascinating facts as to design, power and flight circumstances that have ushered in what the author characterizes as "The Second Age of Flight."

Some appreciation of the amazing progress in jet and rocket-propelled flights comes from the knowledge that reaction-propelled aircraft speeds in the short span of 17 years have been increased from about 95 mph to well over 600 mph. Of the 12 planes singled out for discussion in Mr. Colwell's booklet, three planes are of German design, five are American, two English, one Italian and one Japanese.

It was a publicity stunt designed by Herr Max Valier in Germany in September 1929, the author points out, "which was to revolutionize human flight, and point the way to endless vistas of aerial exploration." The first flight, an erratic one of 1¼ miles, was completed in 75 sec in a converted glider powered by 16 rockets of 50 lb thrust each. In order to attain flying speed and get off the ground, the plane was mounted on a rail car, an initial start being provided by several rockets attached to the car.

The first jet-propelled flight did not take place until 10 years later, also in Germany. A specially designed Heinkel HE 178 powered by a Heinkel-Hirth HE-S3 gas turbine made a successful flight after many test runs at Rechlin Experimental Station near the Baltic Coast. The landing gear of this plane was retractable and air intake was in the nose of the plane. This design was never put in production but it is credited by Mr. Colwell as "the world's first successful jet-powered man-carrying aircraft."

About 1940 the first Nazi rocket-propelled fighter saw action, according to Mr. Colwell. Powered by a Walter HWK 509 rocket unit, these planes were later used as intercepters against our night bombers. Taking off in total darkness and leaving a glowing trail of flame sparks behind them, these aircraft soon acquired the name of "Komet." Maximum speed was 550 mph. Failing to breakup or demoralize allied flying formations, the Germans eventually changed their tactics and resorted to making single passes at our planes, after which they dove away into the darkness. These planes had only limited effectiveness as an offensive weapon, according to Mr. Colwell.

Intended as a plane designed to operate at supersonic speeds at high altitude, Signor Campini's CC2 is mentioned as a plane that flew successfully and paved the way for future jet development. Most spectacular performance of this plane was the much-publicized Milan-to-Rome flight.

ENGLAND'S first jet flight was May 15, 1941, in a Gloster E 28/39, a small single seater with very thin wing sections and a retractable landing gear. Curiously enough, this plane made its first flight when the pilot inadvertently found himself in the air during a ground test run.

America's first jet plane, a Bell XP-59, made its first successful flight Oct. 1, 1942. According to legends, at Muroc Army Air Base in California, a squadron of Lockheed P-38's on routine training flight suddenly found a strange craft in their midst, piloted by an airman wearing a derby hat and smoking a big black cigar. The plane had no propeller! And the wide-eyed P-38 pilots found themselves quickly outdistanced in the impromptu race that followed. Only three of these planes were built.

The P-80 conceived in June 1943 was first flown in January 1944. Among the records held by this plane is a speed record of coast-to-coast flight in 4 hr, 13½ min at an average speed of 585 mph. A P-80 also won the Thompson trophy, averaging 515 mph. In June 1947 this aircraft established a world's speed record of 623.8 mph, the first time America had held the world's speed record in 24 years.

At the battle of Okinawa the desperate Japanese introduced the Baka Kamikaze suicide bombs. Launched from an altitude of 27,000 ft from a bomber, these suicide weapons were dropped 50 miles from the target. The bombs glided at 230 mph until the final approach when 24 rockets in the tail were ignited to drive the plane with its 1000 lb warhead at its target at speeds exceeding 600 mph. The fuselage of this Kamikaze rocket plane was of metal with wood structure used in the wings. Controls were standard. Once the pilot was in his seat his doom was sealed.

Another plane described in the Thompson booklet is the Ryan FR-1 "Fireball" which marked the first successful combination of reciprocating and jet powerplants in aircraft. The jet engine installed in a standard fighter plane was designed to give tremendous acceleration in combat. This plane, first flew in June 1944 and had a maximum speed of 425 mph.

OUR second jet-propelled fighter was the Republic P-84 "Thunderjet" first flown in February

1946. This plane had a nose air intake instead of the side air scoops used in the P-80 and is powered by a GE-Allison J-35 jet engine. Maximum speed is over 600 mph, and flight range 1000 miles.

The latest English jet plane described is the Gloster "Meteor" which set a world's speed record in September 1946 of 616 mph. This ship is powered by two Rolls-Royce turbo-jet engines, and weighs 14,000 lb.

Last but not least is Bell's XS-1 Rocket Plane powered by four Jet Reaction Co. Rocket engines. According to Mr. Colwell, the ship has been designed for 1000 mph speeds. (Recently, unconfirmed reports indicate this rocket plane has successfully broken through the sonic speed barrier.)

Recalling that most of the chapters in "The Second Age of Flight" have been written in less than 10 years, one wonders what progress the next 10 years will bring, particularly in an aircraft world spurred on by the possibility of another holocaust.

Looking at automobile production for 1948, K. T. Keller, president of Chrysler Corp., has pointed out the steel supply remains the key to car production. Sheet and strip steel are still almost as tight as at any time since the end of the war, Mr. Keller said. The Chrysler head could see no relief in the form of more steel during the first half of 1948. "It is much too early to tell what the last half of 1948 may bring," he said. Barring interruptions, Chrysler thinks the auto industry should produce motor vehicles in 1948 "at about the 1947 rate or perhaps a few more."

Mr. Keller was careful to point out that while sheet steel supply is the big hurdle for 1948 other factors are causing genuine concern. These factors include the price spiral which gives no sign of having reached the top and the possible effects of the Marshall Plan which will divert an undetermined proportion of American goods to the export market.

THE auto industry, Mr. Keller asserted, cannot escape the effects of these factors and any resulting limitation of the supply of goods available for domestic consumption.

During the year 1947 Chrysler Corp. shipped from its U. S. and Canadian plants a total of 1,006,000 vehicles. This was the fourth time Chrysler has surpassed the million mark in vehicle production.

This week Oldsmobile began assemblying some of its 98 "Futuramic" models. It has been disclosed that the postwar Oldsmobile will have a curved windshield and a larger rear window for better vision. The car will have a complete new body and a new high compression head for its 115 hp engine. Informed sources report that styling of the new Oldsmobile will tend toward the conservative side; the rear fender will not disappear entirely as in the case of Kaiser-Frazer, Hudson and Packard, it is reported. It is expected, however, that the front fenders will be the pontoon type employed in all the postwar cars introduced up to the present time.

•

Levy Accepts UAW-CIO Appointment to Serve As General Counsel

Detroit

• • • **Irving J. Levy,** Washington, attorney and former head of the legal division of the Department of Labor has accepted a temporary appointment to the $25,000 a year post of general counsel of the UAW-CIO. Rothe & Zwerdling, Detroit, has been named associate general counsel.

The Detroit law firm will handle part of the legal work of the UAW-CIO. Total legal expenses of the union during 1946 was $102,000. Levy succeeds Maurice Sugar, who has served the union for more than 10 years.

Levy is a member of the Washington firm of Rauh & Levy. He was formerly chief of the litigation section of the Wage & Hour Div. and was later made head of the office of solicitor of the labor department. During the war he served as special assistant to the Attorney General in the war division of the Justice Department.

Nicholas J. Rothe of the firm of Rothe & Szwerdling has practiced in Detroit for 25 years. During the past 10 years he represented many CIO organizations and local unions. Zwerdling was formerly affiliated with Michigan Unemployment Compensation Commission and with the National War Labor Board. He has been a technical adviser for Reuther for the past 4 years.

•

Ferguson Says Ford Lured GM Men With Profit Participation

• • • The suit for $251 million filed last week by Harry Ferguson against the Ford Motor Co. may result in an extended court test that will rival any of the famous Ford court battles of the past. In a conspiracy charge, Ferguson has alleged that part of the inducement which brought high-salaried GM executives to Ford was a chance at profit participation in Dearborn Motors headed by Frank Pierce, former GM vice-president.

Replying to the Ferguson charge, Henry Ford II said, "The suggestion of conspiracy or unfair competition is ridiculous. The relationship between Ford Motor Co. and the Ferguson Co. made Ferguson a multimillionaire and cost Ford Motor Co. $25 million in the process."

The Ford-Ferguson relationship was broken off the latter part of 1946, but Ford continued to supply tractors to Ferguson for an additional 6 months, at which time distribution of Ford tractors was taken over by Dearborn Motors.

Best Profit Since 1928

Detroit

• • • **A net profit** of $3,367,792 for the fiscal year ended Sept. 30, 1947 has been reported by Willys-Overland Motors, Toledo. This profit after allowance of $698,163 for preferred dividends was the company's best peacetime net since 1928. Net profit for the previous fiscal year was $402,900.

Gross income from the sale of universal jeeps, trucks, station wagons and other Willys products amounted to $138,791,292 which is more than double the previous year's total. Willys announced plans to produce 200,000 vehicles during the fiscal year ending Sept. 30, 1948.

Washington . . . EUGENE J. HARDY

• Senate Committee report on steel provides breather in hectic month of control proposals . . . Report ducks expansion issue . . . Asks end of wartime Hyde Park Pact on exports to Canada.

WASHINGTON — In one of the roughest legislative months the steel industry has known for years, the new report on steel supply and distribution issued by the Senate Small Business Committee provides the least of the industry's headaches.

If the industry felt that it was being mistreated — until the past few days—over the pushing around it has received from the federal government since the war's end, it hadn't seen anything until the dawn of 1948. Fortunately, however, it looks as if the biggest legislative hobgoblins are making their appearances early in the year.

The Senate Small Business Committee's report, as previously mentioned in THE IRON AGE (Dec. 18, p. 108), keeps its nose out of the capacity expansion issue, and in its seven recommendations says nothing calculated to upset the industry's policy planning for 1948.

The report comes as a breather in a period dotted with events like the gray market hearings of the Macy subcommittee, Secretary Harriman's conference on voluntary allocations, the Federal Trade Commission's initial hearing on price-fixing charges and White House indignation over failure of Congress to enact mandatory industrial controls.

Industry chiefs, therefore, can settle down to read Senator Martin's interim report on steel supply without reaching for the bromo. The body of the report is devoted to a review of hearings and findings of the past year. And the seven recommendations for corrective action listed in the report are actually seven individual programs already under way.

THE gist of the seven recommendations, point by point, is this:

(1) Producers should review customer needs with a view toward correcting distribution inequities.

(2) Each company should closely check its sales in order to block diversion to gray markets.

(3) FTC should open an investigation into withdrawal from established distribution areas, acquisition and subsequent withdrawal from trade of facilities, acquisition to assure output, and sales records showing transfers of steel to integrated operations within a company.

(4) Export controls should be renewed and strengthened.

(5) Export control programs should be reviewed periodically with representatives of industry.

(6) Recovery of scrap from government sources should be speeded up.

(7) Voluntary allocation controls should be reimposed only if small business is assured a "fair share" of products being allocated.

Turning to a detailed discussion of what it feels is a postwar breakdown of the historical distribution system, the committee clucks rebukingly at the industry with references to Civilian Production Administration "agreements."

IN 1946, the committee recalls, government and industry officials agreed after a series of CPA conferences to adhere to a "modified" historical quota plan of distribution that would take care of established customers, newcomers, veterans, military agencies, and particularly small business. Many a producer now looks back on those relatively halcyon days of reconversion with a nostalgia usually reserved for Herbert Hoover and a "normal" 88.5 pct of capacity operation.

"Evidence taken by the subcommittee shows that many old customers are not being taken care of," the report chides. The knuckle-rapping continues: "Some newcomers are being ignored by the industry, while others are being supplied; small business, old or new, is not being assisted to maintain a minimum economic level of production; some steel producers have withdrawn distribution from certain areas, leaving the others unwilling or unable to take up the slack; some other mills have found it impossible to take on new customers or have failed to assume any responsibility to serve the old customers of facilities they have absorbed."

"The gray market still flourishes," the report declares, "and has, if anything, become better organized. It is clearly the responsibility of the steel industry to take steps to wipe out such activity and to assure the return of such tonnages to normal channels of trade."

Sen. Holland, D., Fla., and Sen. Ellender, D., La., do not concur in the majority report of the steel subcommittee as reported here. The minority view is presented on page 113.*—Editor.*

Regarding exports, the report avows the committee's intention to keep a close check upon export quotas, export licenses and State Dept. special projects. It warns that the steel subcommittee "will protest in public hearing the issuance of licenses for steel pipe and all other short-supply steel products which are not accommodated within export quotas that, in turn, have some basis of reality in relation to domestic requirements."

THE so-called Hyde Park Agreement — a 1941 pact between President Roosevelt and Prime Minister King of Canada—is due for further investigation by the committee with a view toward its

Steel goes UP and OVER

Sheet steel is picked up from truck by a special grab and electric hoist. American MonoTractor propels the load across the jib and into warehouse.

2-ton bundles of steel move easily over the stacks by push button control of power operated carrier traveling on American Rail-Master Track.

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In these particular plants steel goes up from truck, is transported overhead, and stacked in high piles for subsequent fabrication. Increased production at lower costs has resulted.

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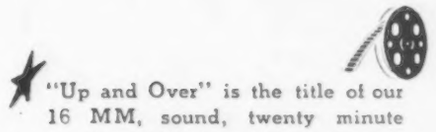
Let an American MonoRail engineer show you how an overhead system will increase your production and pay for itself in a very short time.



"Up and Over" is the title of our 16 MM, sound, twenty minute movie..gladly loaned upon request.

THE AMERICAN MONORAIL COMPANY

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termination, the report discloses. The agreement, which actually is a series of letters exchanged by the U. S. and Canada during the war, permits uncontrolled movement of all exports from the U. S. to Canada. No termination date is fixed or even suggested.

Information concerning the agreement has been forwarded to the Senate Judiciary and Foreign Relations Committees, the report states, with the recommendation that terms and commitments be "reviewed in the light of present-day economics in order to determine why export controls should not be put into effect between Canada and the U. S. in the same manner and to the extent as that decreed for other nations."

Taking a wide-eyed look at the scrap shortage, the report notes that the industry consumes some 25 million gross tons of scrap annually when running at capacity and wonders where the scrap will come from to assure a 2.5 million ton expansion program. As a solution, it proposes a joint government-industry campaign to clean up all available scrap from the four principal government sources. It lists these sources as:

(1) Surplus equipment under control of the armed forces.

(2) Surplus tools and machinery held by War Assets Administration.

(3) Damaged and obsolete vessels.

(4) Army and Navy battlefield scrap.

OF THESE, the likeliest source is WAA inventories, the report suggests. The committee calls attention to WAA's greatest weakness—its admitted ignorance of inventories—and hints that liquidation of what surplus stocks are on hand is long overdue. "At a recovery rate of about 15¢ on the acquisition-cost dollar, it would hardly seem worth prolonging the agony," the report states.

The committee's solution for early liquidation of the surplus disposal agency is (1) bring out for quick sale at home and abroad those items of value remaining, and (2) consign the balance for sale as scrap. WAA's latest report has stated that "nonstandard and special industrial materials and production equipment now dominate the inventories."

The report takes exception to what it terms "understatements with regard to exports" in the Harriman Report, the Krug Report and the First Quarterly Report on the Second Decontrol Act. "The general impression is given that European needs can be accommodated within present exports, and moreover it is taken for granted that current exports are at a supportable level from the standpoint of the domestic economy," the committee states.

"It is evident that this country cannot export the amounts of steel sheet, strip, plate, pipe and tubular goods which are now going out, and support the vital and strategic industries necessary to maintain the health and welfare of this nation," it continues. "If a realistic survey of steel requirements were made, it would show that, under present conditions, all steel production now available is needed in the domestic economy.

"The steel subcommittee will be interested in seeing that the businessmen of this country, and especially the smaller businessman, shall have an opportunity to express themselves freely and forehandedly, on any restrictions, limitations, or special programs which may be proposed," the report sums up.

Stalin on Last Legs

Ankara (By camel dispatch)

• • • According to THE IRON AGE Cairo correspondent, who is known to have spent a weekend in Teheran recently, Stalin is definitely dead, or at least suffering from an acute migraine.

The correspondent based his intelligence on the fact that reports in the middle east indicate that a famous Swedish surgeon has not been seen recently in his usual table in his favorite Stockholm restaurant for the last four days. An aged Turkish shepherd also recently reported seeing a black cross in the north sky at dawn on Tuesday of last week.

Advices here are that Mr. Molotov will undoubtedly replace Mr. Stalin as head of the Russian state, barring the possibility, always existent, that some other individual may be chosen in his place.

Editor's note: Transmission of the remainder of this message was garbled, although it seemed that our correspondent was definitely trying to convey something.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

TH' BULL AIN'T DOIN' AS WELL AT THAT AS HE DID AT THE MACHINIST TRADE, WHICH HE STUCK AT TILL HE MADE A SUCCESS -- BUT HE DON'T STICK VERY WELL AT THEM FALSE TEETH, BIFOCAL GLASSES, AN' ARCH SUPPORTS!
NO, HE TAKES 'EM OFF TO REST TOO OFTEN TO EVER LEARN TH' TRADE -- I MEAN GET USED TO 'EM!
1-16
J.R.WILLIAMS
THE LOAFER
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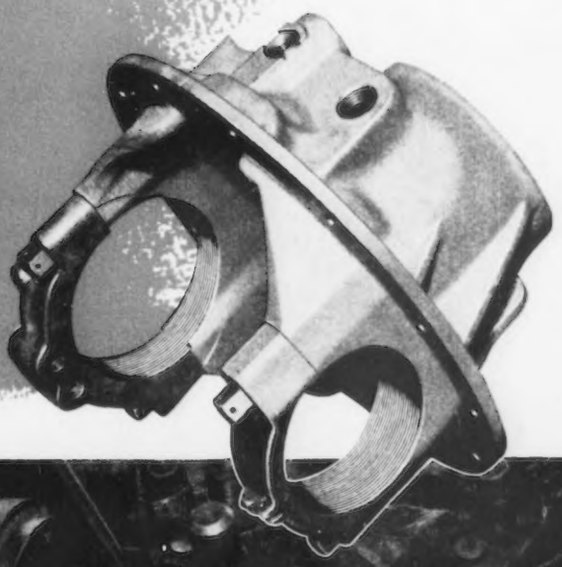
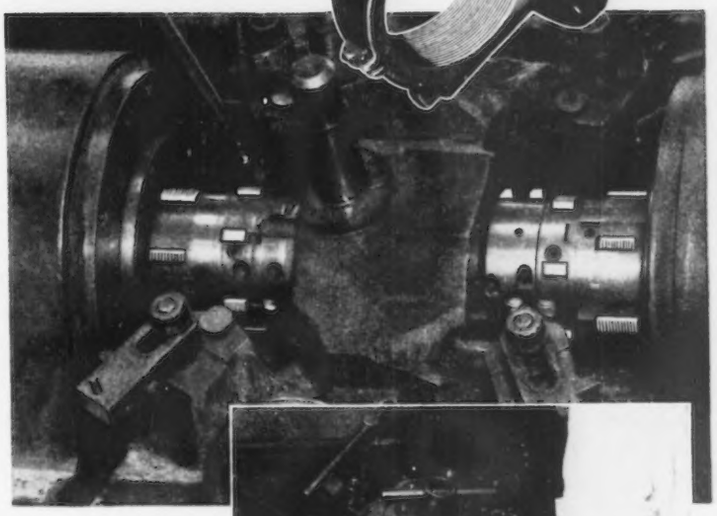
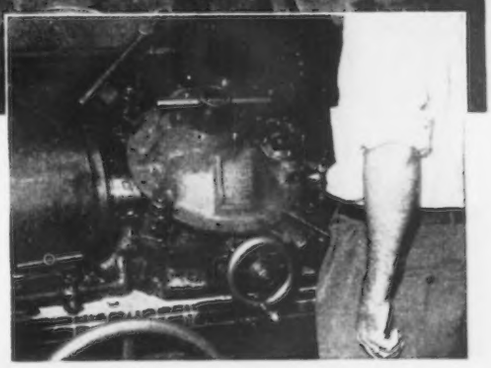
bore ream thread

IN *ONE* OPERATION







Photographs, courtesy of Eaton Manufacturing Co., Cleveland, Ohio.

The operation pictured here is typical of the practical economy made possible by the use of Murchey engineered tools.

The work piece is a truck differential carrier. It is assembled with both caps and machined on a double end unit equipped with Murchey special machine taps with rear pilots and forward boring and reaming heads.

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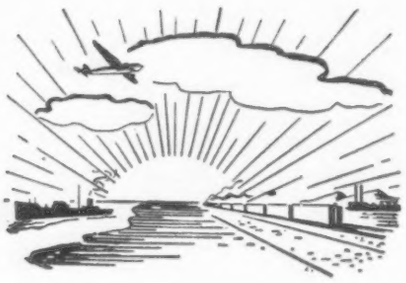
West Coast . . .

ROBERT T. REINHARDT

• Purchase of defunct aluminum plant by Columbia Steel Co. will bring earlier operation of projected rolling mill at Torrance, Calif. . . . Southern California makes minor motor news.



SAN FRANCISCO—Purchase of the hulk of what was once an aluminum reduction plant at Torrance, Calif., from the War Assets Administration by Columbia Steel Co., U. S. Steel Corp. subsidiary, will probably enable that company to bring its projected 300,000 ton capacity sheet mill into operation about 5 months earlier than could otherwise be expected, it is believed.

Although the purchase of this war surplus facility for $4,200,000 awaits the approval of the U. S. Dept. of Justice, there is little reason to believe that this authorization will be withheld. The plant was built at the start of the war by the Aluminum Co. of America for the DPC to produce primary aluminum from alumina at a cost of approximately $24 million, including the intricate and elaborate electrical system. It had a capacity of approximately 89,000 tons of aluminum pig per year and required 1,602,000,000 kw-hr for capacity operation.

According to WAA, a large part of the aluminum reduction equipment valued at approximately $5 million has already been sold and another $6½ million worth of electrical equipment has been removed by WAA. Therefore, the cost of the buildings and site being purchased by Columbia is estimated at approximately $13 million.

The plant is less than a mile from the already operating open-hearth and finishing facilities of Columbia at Torrance and will thus enable possible later integration with that unit if this proves desirable. However, the plans announced for a rolling mill in the Los Angeles area last September indicated that production there would principally involve the cold reduction of sheets shipped in from other U. S. Steel Corp. producers—probably Geneva Steel Co. in Utah after a hot strip mill is built there, or the Tennessee C. I. & R.R. Co. at Birmingham.

Although the aluminum plant had 55 buildings, but few of them as they now stand will be usable by Columbia. There will be a number to be wrecked and others to be remodeled. Even so, large tonnages of structural steel will be saved by utilizing as much as possible of the existing structures on the 129 acre site.

Columbia is scheduled to pay the government $500,000 on Feb. 1 and the balance of the purchase price when the transaction is approved by the Dept. of Justice. Columbia is purchasing a transformer for $150,000 in addition to the plant purchase. Columbia hopes to have the cold reduction mill operating in 1949.

ONE expansion in the steel industry announced last year began operations last week in Los Angeles. The 50-ton capacity electric furnace of Bethlehem Pacific Coast Steel Corp. poured its initial heat to inaugurate a schedule which calls for approximately 96,000 tons per year. This will increase present capacity of the Los Angeles plant approximately 80 pct. At present only carbon steel is to be made in the new furnace.

Bethlehem Pacific Coast Steel Corp. has announced that 1947 production of finished steel set an all-time high record. South San Francisco plant shipped 181,570 tons; Seattle, 177,507 tons; and Los Angeles, 95,501 tons. This total of 454,578 tons is an increase of more than 30 pct over 1946 and is attributed in large measure by president H. H. Fuller to improved labor conditions.

Kaiser Co., Inc., reports that ingot production at its Fontana steel plant in 1947 reached 795,728 net tons, or about 110 pct of its open-hearth capacity. The electric furnace has been down for almost 2 years.

SALT LAKE CITY—One of the first definite signs of the development of satellite industries around the Geneva Steel Co.'s plant is the start of construction of a $175,000 fabricating plant on a 43-acre tract of land southwest of the city by the Chicago Bridge & Iron Co.

This company, a long-time customer of the U. S. Steel Corp., fabricates tanks, pipe, structural steel and plate work. E. S. Frazier is to be the superintendent of the plant and was formerly located in the Chicago plant of the company.

Other steel users are reportedly interested in the latest offering of the War Assets Administration. This is the modern, surplus war plant located here which consists of 35 buildings covering approximately 1 million sq ft of floor space which is reportedly adaptable to a large number of industrial users.

This group of buildings was the Army's Utah subdepot and was operated by the Remington Arms Co. from 1941 to 1943 for the manufacture of 0.30 and 0.50 caliber ammunition. Equipment has been removed and the property has been used for general warehousing and storage by the Army.

There are 5000 acres involved in the plant site and spur tracks connected with the Union Pacific, Denver and Rio Grande, Western Pacific, MK&T, and the Frisco serve the entire area. The buildings were designed to carry heavy floor loads and are arranged for assembly line production.

Proposals to purchase this property must be received by 3 p.m. eastern standard time, Friday, Jan. 30, 1948 by the WAA Salt Lake City regional office.

Controversy over the recent disposal by the WAA of the Kalunite plant to the J. R. Simplot Co. has not deterred the purchaser from taking possession.

There is still a possibility of the American Potash & Chemical

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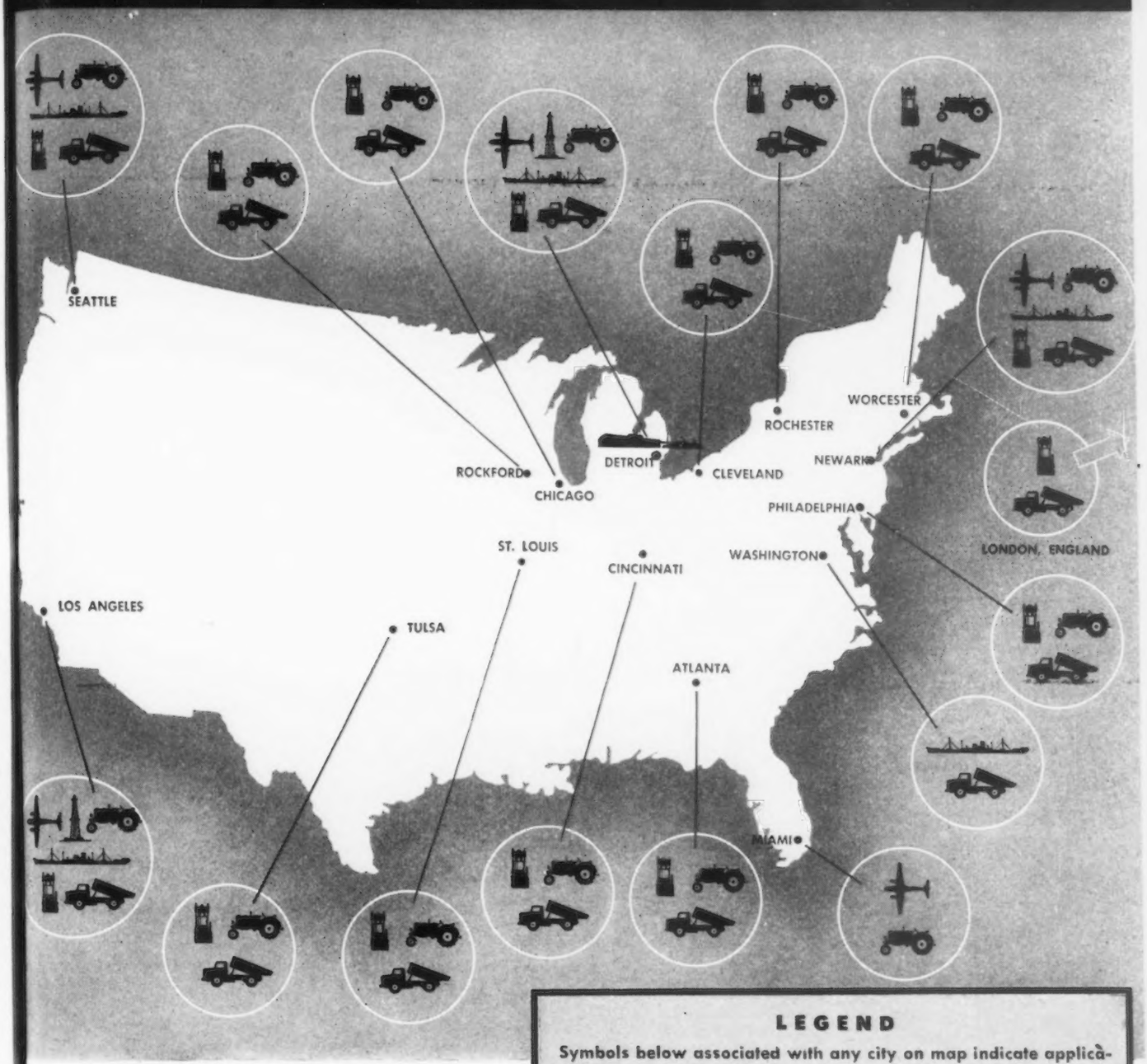

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Co. contesting the award and it is now reported that this company has raised its bid on the plant to $800,000 which is $48,000 more than the Simplot Company is paying. Original bid of Simplot was $625,000.

According to O. A. Power, vice-president of the Simplot Co., contracts are being negotiated for obtaining sulphuric acid and anhydrous ammonia which are necessary to produce the ammonium sulphate which will be the principal product.

The contention of the WAA that by awarding this plant to Simplot it was conforming with the spirit of the Surplus Property Act, and was promoting competition in the fertilizer field, is questioned by the supporters of the American Potash Co. who state that the Simplot organization already has a monopoly on the production of commercial fertilizers in the Intermountain area.

LOS ANGELES — Footsore pedestrians who long to be motorists had a few grains of encouragement tossed their way here recently.

Ford Motor Co. is expected to start producing Lincoln-Mercury cars in its newly completed assembly plant here at the rate of approximately 200 a day within a few weeks. While the plant has been completed for some time with the exception of minor details, actual assembly has been held up awaiting word from Detroit which has been dependent upon the supply of parts. Production at the local plant will be sent to western distributors only.

Another ray of hope developed from San Diego where a low-priced, 600 lb, convertible coupe was announced by the International Motor Car Co. With the exception of axles, bearings, springs, bumpers and steering columns, the machine will be built entirely of aluminum and is said to sell for $595 f.o.b. San Diego.

Storage space is provided under the front hood and the two-passenger model now being built is powered by a 16.6 hp, air-cooled, two-cylinder motor. A chain drives the two rear wheels and maximum speed is reported at 50 miles an hour with fuel consumption rated at between 45 to 50 miles per gallon. Overall length, bumper to bumper, is 116 in. S. A. Williams is president of the International Motor Car Co.

Both motorists and pedestrians with hopes, are interested in a new disc brake which is claimed to stop an automobile about 80 pct quicker than the conventional brake. It is operated both hydraulically and mechanically by independent systems.

BUILT by the Kinmont Mfg. Co., this new clutch-type brake operates more effectively under all conditions than the standard type, according to the manufacturer. A stationary circular pressure plate is attached to the axle of the car with a movable pressure plate fastened to the stationary member with spring straps.

This aluminum disc insert with friction lining riveted on both sides revolves between the pressure plates and is turned by a driving member attached to the wheel hub. To stop the motion of the wheel, the pressure plates are squeezed together on the turning friction disc, causing the car to stop quickly without grabbing or locking, it is said.

According to the manufacturer, this brake is so constructed that heat will not affect the braking area. A flow of air is routed from the driver member and spring straps which allow the pressure brake to expand without sacrificing any of the braking surface are used.

It is stated that whereas heat throws the conventional brake out of adjustment because the number of square inches of braking surface decreases rapidly as the drums expand, the manufacturers of the disc type brake claim that it has 100 pct contact on the braking surface at all times as compared with an average of only 55 pct on the conventional type of brake.

There is still no indication of the opening of the Long Beach plant of the Kaiser Frazer Corp. where these two cars are to be assembled for West Coast distribution. According to the latest available information, plans for the opening of this plant are still dependent upon the availability of parts to bring production at Willow Run up to 1500 cars per day. According to Kaiser officials, the plant is being maintained in a standby condition and can be placed in operation on short notice despite rumors circulating early last year to the effect that it might be put up for sale and the project of assembling Kaiser-Frazer cars on the West Coast abandoned.

SUPER FOOT WARMER: *These workmen are installing an electradiant heating system in a new San Jose, Calif., home. Wire rope cables which carry high amperage current are laid over glass wool floor insulation. Best asset of this system is an even, constant distribution of heat. Good insulation is a prerequisite.*

How the First All-Steel Welded Vise is Made

By H. F. Seymour, President
Columbian Vise & Manufacturing Co.
Cleveland 4, Ohio

WHAT is believed to be the first all-steel vise fabricated by arc welding is the Columbian Work Shop Vise shown in Fig. 1. This vise was redesigned in collaboration with Parsons Engineering Corp., welding specialists, from conventional construction to arc welded steel to achieve superior strength, accuracy and long life.

Basic material used is SAE 1020 hot rolled steel plate, punched and formed to the proper shapes. Fig. 2 shows the component parts. The base plate is $\frac{3}{8}$" thick,

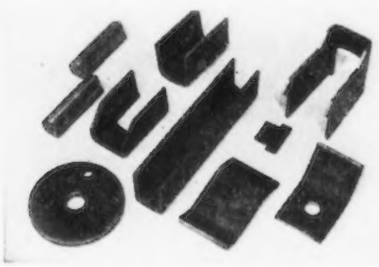

Fig. 2. Component parts of the vise.

the nose piece $\frac{5}{16}$" and all others $\frac{3}{16}$".

The first fabricating operation is the welding of the front, or sliding, half. The rail, T-blank, front body and jaw are assembled in a jig and tack-welded. In

Fig. 3. Welding front body to rail with inside fillets.

this same jig the front body is welded to the rail with inside fillets (see Fig. 3), and the nose piece tacked on.

This front half is then passed to the

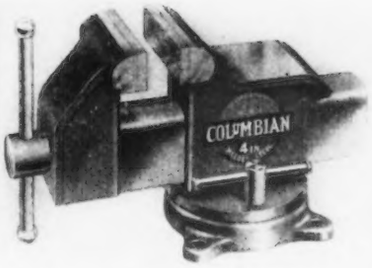

Fig. 1. The Columbian all-steel welded vise.

next welder, who makes the final fillets which join the nose piece and T-blank to the front body. The next operator welds the jaw to the nose piece.

Meanwhile, the rear half of the vise is being assembled in similar manner by another bank of welders. The rear body and swivel base are assembled in a jig and tacked together by the first man. The next man welds these parts with continuous fillets.

The front half and the partially-assembled rear half of the vise are then passed to a welder who fits them together. He inserts the sleeve, or inside guide, in the rear body, slides the rail of the front half through it, and welds the sleeve to the rear body with four 1-inch welds. Fig. 4 shows how the assembly is clamped in the jig. He then tack-welds on the rear anvil.

The vise then goes to the last welding operator, who welds the rear jaw to the anvil and the anvil to the rear body.

The vise assemblies are passed from one operator to the next by means of steel chutes.

Air hammers are used to peen the welds and clean off the spatter, and the welds are then ground smooth. Hardened steel jaw faces are drilled and counter sunk into the jaws. The screw and handle are forged steel and the malleable iron nut is replaceable.

AWS Type E-6030 electrode is used for welding the rear body to the base in

Fig. 4. Raising clamp which held inside sleeve for welding to rear body.

order to get a fillet with exceptionally deep penetration. For all other welds, E-6012 electrode is used.

With 12 set-up men and welders, 1,000 vises are produced a week. Production can be stepped up to 2,500 a week by increasing the force to 22 men.

Fig. 5. Making final welds—anvil to body, and jaw to anvil.

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(Advertisement)

PERSONALS

o o o

• **Stanley L. Willis** has been appointed president and general manager of the Standard Tube Co., Detroit, succeeding **T. F. Thornton,** who has retired. Mr. Willis was formerly vice-president and general manager. He joined the organization in 1943.

• **A. G. Wood,** superintendent for the past 18 years of the Crucible Electric Steel Co. of Homestead, Pa., has joined the Bedford Tool & Forge Co., Bedford, Ohio, as superintendent.

• **Harry H. Rose** has been named general sales manager of the Simmons Fastener Corp. of Albany. During the last 3 years he has been a sales engineer for the company. Prior to that, he was an engineer for the Simmons Machine Tool Corp., the parent company.

• **John E. Dunbar** has been appointed sales manager of Superior Foundry, Inc., Cleveland. Mr. Dunbar had been associated with the Lycoming Motor Corp. for 17 years and for the past 10 years with the White Motor Co. as director of purchasing.

• **Alfred J. Olson** has been made assistant sales manager of the Chicago plant of Joseph T. Ryerson & Son, Inc. He succeeds **Ray C. Page,** who has been named sales manager of the company's new steel service plant under construction in the San Francisco area. Mr. Olson became a member of the Ryerson organization in 1923. He progressed through various divisions of the company —advertising, claim, work order and inside sales—until his appointment in 1936 as sales representative in Illinois.

• **W. J. Hanna,** formerly district sales manager of Republic Steel Corp., has become associated with Weiss Steel Co., Inc., Chicago.

• **George R. TenEyck** has been appointed purchasing agent of Geneva Steel Co., Geneva, Utah. Mr. TenEyck had been named purchasing agent of Columbia Steel Co.'s Utah operations in 1941 and in 1943 he transferred to the Geneva Steel Co. **John F. Maloney** has been named traffic manager of Geneva, where he has been serving as assistant traffic manager since 1944.

• **E. D. Cayia** has been named auditor in charge of accounts and **J. E. Clermont,** auditor in charge of audits and procedures, Inland Steel Co., Chicago. Both have been assistant general auditors with the company. **W. A. Kendrick,** general auditor of Inland, who had been associated with the company since 1918, has retired.

C. H. WILLIAMS, chief engineer, Carnegie-Illinois Steel Corp.

• **C. H. Williams** has been appointed chief engineer, Carnegie-Illinois Steel Corp., Pittsburgh, U. S. Steel Corp. subsidiary. He began his association with U. S. Steel in 1927 in the power department of National Tube Co. In 1930, Mr. Williams joined Carnegie-Illinois at Ohio works in Youngstown, and in 1940 was transferred to the Pittsburgh office as a power and fuel engineer. In 1941 he was placed in charge of a special engineering staff coordinating Defense Plant Corp. construction in the company's Pittsburgh district plants. He was made chief engineer for the Pittsburgh district of Carnegie-Illinois in 1943.

• **Richard K. Mellon** has been elected a member of the board of General Motors Corp., New York. Mr. Mellon is chairman of the board of the Mellon National Bank & Trust Co. of Pittsburgh.

• **Paul W. Howard** has been appointed chief industrial engineer of Crucible Steel Co. of America, Pittsburgh. Mr. Howard was previously with Sharon Steel Corp.

• **John F. Crossin** has joined Crosley Motors, Inc., as manager of the company's commercial sales division. Formerly manager of the refrigeration division of the Crosley Corp., he will make his headquarters in Cincinnati.

• **William A. Metcalf** has been appointed sales representative in the Kansas City territory for Reliance Electric & Engineering Co., Cleveland. Mr. Metcalf is associated with Carl P. Lohr Co.

• **John C. Wallace** has retired as vice-president and director of sales for Perfection Stove Co., Cleveland, after 34 years of service.

• **Howard A. Marple** has been appointed director of the newly-created advertising department of Monsanto Chemical Co., St. Louis. Mr. Marple, who has been with the company since 1937, served as editor of the Monsanto magazine for many years and since 1944 was manager of trade advertising. **Allan Gardner** has been appointed assistant director. He has been with the company since 1943.

• **Grover M. Hoff** has retired as superintendent of the foundry division of Columbia Steel Co. at Pittsburg, Calif., after almost 30 years of service with that company. He joined the Pittsburg, Calif., subsidiary of U. S. Steel Corp. in 1918.

• **Frank Soles,** former assistant to the vice-president in charge of production at the A. O. Smith Corp., Milwaukee, has been made plant manager of the Michael Yundt Co., Waukesha, Wis.

• **Harvard P. Stewart** has been named manager of marine sales for the San Francisco Bay area shipyards of Bethlehem Steel Co. **Russell R. Sweeny** has been named as manager of Bethlehem's Alameda repair yard to replace **F. S. McGuigan,** who has been transferred to an executive position with the company in the East. Mr. Sweeny was formerly assistant to the general superintendent at Bethlehem's San Francisco yard.

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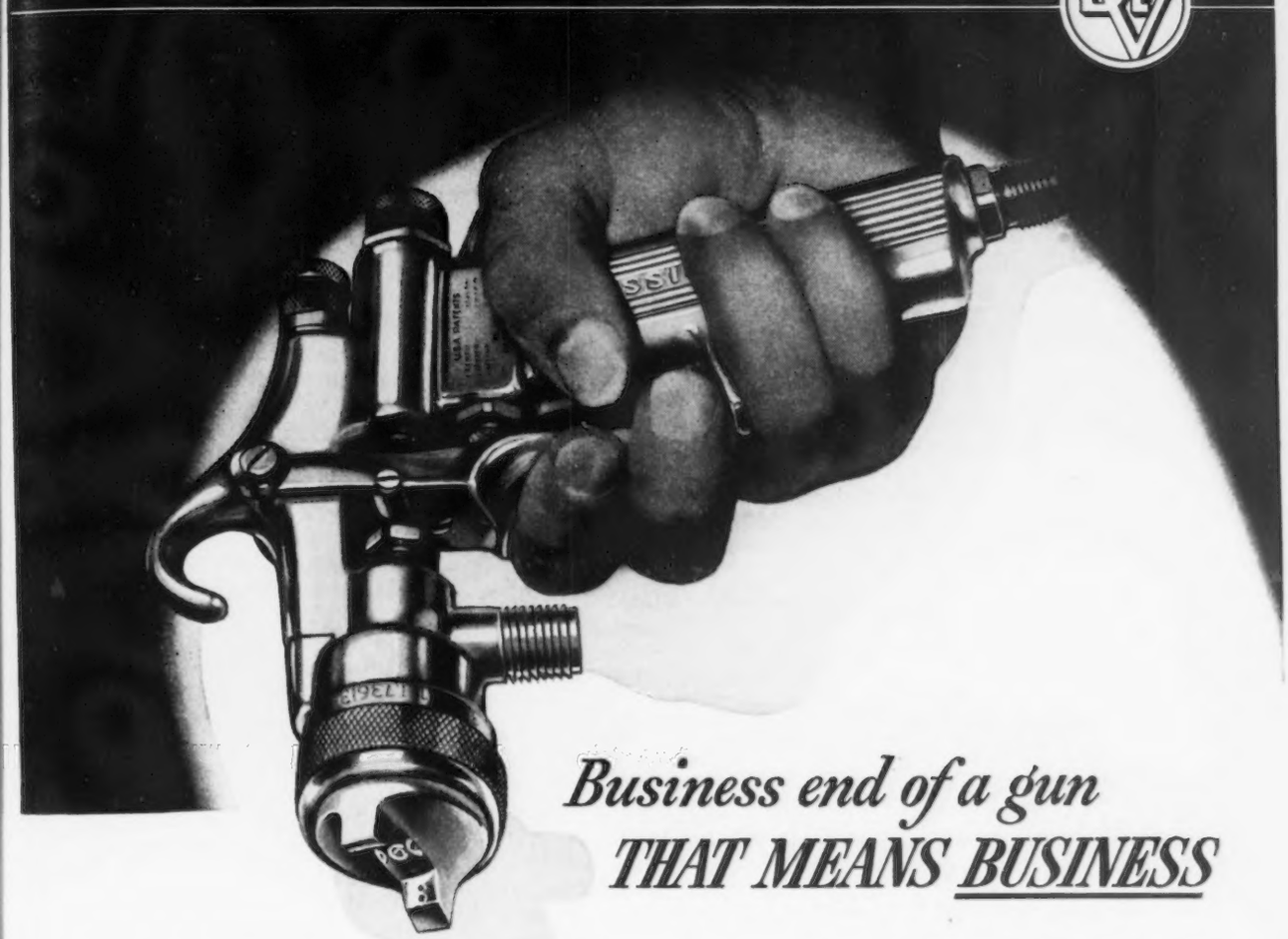

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BAY E. ESTES, JR., director of commercial research, U. S. Steel Corp. of Delaware.

• **Bay E. Estes, Jr.,** has been named director of commercial research, U. S. Steel Corp. of Delaware, Pittsburgh. He succeeds **Kemp G. Fuller,** who has resigned. In 1939 Mr. Estes joined the commercial research division of the Delaware Corp. He was made assistant manager of the division in 1943, the position he held at the time of his present appointment.

• **Norman M. Sedgwick,** former sales compressor manager of sales at Le Roi Co., Milwaukee, has been placed in charge of a newly-opened central district sales office for Le Roi located in Milwaukee.

• **Henry Zinner,** former assistant vice-president of the Chicago Terminal Bank, has been named assistant to the president of the Coan Mfg. Co., Madison, Wis. **V. R. Johnson,** sales manager at Coan, has been elected vice-president in charge of sales.

• **Arne Johnson,** general superintendent of the Nordberg Mfg. Co., Milwaukee, and with the firm 50 years, has retired.

• **George T. Motock** has been named director of research, Champion Rivet Co., Cleveland. Before joining Champion, he was associated with the Bureau of Mines, Battelle Memorial Institute, and was director of research and development for Republic Steel Corp., Cleveland district.

• **James McWhirter** has been placed in charge of fluorine product process development and manufacture for the Pennsylvania Salt Mfg. Co. Mr. McWhirter, superintendent of Pennsalt's Natrona, Pa., plant for the past 2 years, will direct all phases of Pennsalt's activities in fluorine product manufacturing, temporarily from the Easton, Pa., plant. **Gail E. Barr,** who joined Pennsalt in 1912, has been named acting superintendent of the Natrona plant.

• **Joseph L. Hohl,** former assistant plant manager at Hudson, N. Y., for the Universal Atlas Cement Co., has been appointed manager of the company's Leeds, Ala., plant. Mr. Hohl succeeds **William O. Lawrence,** who has been named assistant manager of the Buffington, Ind., plant.

• **Harvey E. Schlach** has been appointed sales manager of the power brake division, Midland Steel Products Co., succeeding **C. F. Smith,** who has resigned. Mr. Schlach, whose headquarters will be in Detroit, has been associated with Midland for more than 17 years. **A. R. Leukardt** has been appointed assistant sales manager of the power brake division. He was formerly associated with Bendix-Westinghouse Automotive Air Brake Co.

• **Charles B. McGehee** has been appointed president of the William H. Harman Corp., Wilmington, Del. **William H. Harman,** previously president, has been elected chairman of the board. Mr. McGehee was formerly general manager of sales for Truscon Steel Co.

• **Donald P. Dow,** formerly general manager of Colgate Mfg. Corp., Amityville, N. Y., has been appointed executive vice-president. **Harold Nohe,** former treasurer, has been named secretary-treasurer.

• **Walter E. Thill** will head field engineering activities for Federal-Mogul Service, Coldwater, Mich. Prior to his transfer to the service division, he was employed for 10 years in the Federal-Mogul engineering department as a design and sales engineer.

• **Philip J. Kimball** has been named assistant general manager of the E. I. du Pont de Nemours & Co.'s explosives department, Wilmington, Del., succeeding Harry F. Brown. Mr. Kimball joined the Du Pont Co. in 1919. Prior to his present appointment, he was manager of the explosives division.

• **E. E. Stephenson** has been named manager of Nash Motors Div.'s newly-established marketing and analysis department, Nash-Kelvinator Corp., Detroit. Until his present appointment, he was organization manager, a post he held since May 1946.

• **Donald B. Swain,** general superintendent, Millers Falls Co., Greenfield, Mass., and **Kenneth Saunders,** director of standards, job study, payroll and cost departments, have been made directors of the company.

• **Paul S. Strecker** has been named assistant to the president of the E. W. Bliss Co., Detroit. He will continue to serve as personnel director of the company, with the additional responsibility of handling special administrative assignments. Prior to his association with Bliss, Mr. Strecker was in charge of various personnel work at General Motors. **J. J. Radigan,** personnel manager of the Bliss plant in Brooklyn, has been promoted to assistant director of personnel.

PAUL S. STRECKER, assistant to the president, E. W. Bliss Co.

• **Thomas A. Kennally,** who has been vice-president in charge of sales, has been appointed vice-president and assistant to the president of Philco Corp., Philadelphia. **James H. Carmine,** who has been vice-president in charge of merchandising, has been named vice-president in charge of distribution.

• **Thomas B. Hasler,** formerly president of Wilson Welder & Metals Co., Inc., New York, a wholly-owned subsidiary of the Air Reduction Co., Inc., has been elected chairman of the board of directors, succeeding **C. E. Adams,** who has resigned as chairman and director; and **F. B. Adams, Jr.,** has been elected president and a director. In addition to the presidency of Wilson, Mr. F. B. Adams holds the position of director of apparatus research and production of Air Reduction Co., Inc.

• **Cary Ice,** general machine shop superintendent, tractor factory, Caterpillar Tractor Co., Peoria, Ill., has been named assistant factory manager of the company's new engine factory. Mr. Ice's former duties will be assumed by **George L. Davis,** second shift superintendent, tractor factory, and **H. M. Schafer** who has been assistant to the general factory manager, has been named second shift superintendent, tractor factory. **Charles Verkler,** who has been superintendent of machine shop and engine assembly, will serve as general superintendent of all engine assembly, both basic and industrial engine assembly and test operations. **R. E. Elwood** has been named machine shop superintendent, engine factory.

WILLIAM T. KELLY, JR., first vice-president, American Brakeblok Div., American Brake Shoe Co.

• **William T. Kelly, Jr.,** has been elected first vice-president of American Brakeblok Div. of the American Brake Shoe Co., New York. Mr. Kelly, who has served as vice-president of American Brake Shoe since 1946, has been with the company since 1928. In addition to his new duties, he will continue as president of the Kellogg and Engineered Castings Divs., positions which he has held since 1945 and 1946, respectively.

• **James P. Mahoney** has been transferred from the Monsanto Chemical Co.'s Merrimac Div. at Everett, Mass., to the organic division sales office in Chicago, where he has been placed in charge of Merrimac Div. sales and sales development. Mr. Mahoney has been associated with Monsanto since 1940. **Richard O. Zerbe** has been appointed director of the newly-created development department at the Monsanto Chemical Co. plant at Nitro, W. Va. He was employed at the Nitro plant in 1936 as an assistant research chemist and was transferred to the plant's patent department a year later. **Edwin L. Hobson** has been appointed sales manager of thermoplastic molding materials for Monsanto, succeeding **Arnold C. Martinelli,** who has resigned to become general manager of Rogers Plastics, Inc., North Wilbraham, Mass. Mr. Hobson has been succeeded as assistant branch manager for Monsanto's New York plastics office by **James P. Skehan,** formerly sales manager for sheet plastics. The sheet department has been combined with the packaging materials department under the direction of **Richard C. Evans.** Assisting Mr. Evans as assistant sales managers are **James Brunner,** in charge of packaging materials sales, and **Oscar E. Hollemans,** in charge of sheet sales.

• **Thomas V. Koykka** has been appointed to the board of directors of the Lincoln Electric Co., Cleveland. Mr. Koykka is a partner in the law firm of McKeehan, Merrick, Arter & Stewart and Geo. Wm. Cottrell.

• **Bernard L. Jones** has severed his connection with Salem Engineering Co. of Salem, Ohio, and has become assistant vice-president in charge of sales for H. A. Brassert & Co., New York.

• **J. L. Miller,** production superintendent at the Zelienople, Pa., Johns-Manville factory since 1942, has been appointed plant manager. He succeeds **S. K. Cooper,** resigned.

...OBITUARY...

• **Warren S. Sherman,** president of the Sherman Machine & Iron Works, Oklahoma City, Okla., died recently.

• **William H. Allen,** 73, for 25 years Boston representative of the Phoenix Iron & Bridge Co., died Dec. 31.

• **Ashton R. Peyton,** 59, contracting engineer for the Virginia Bridge Co. at Birmingham, died Dec. 24. He had been associated with Virginia Bridge for 36 years.

• **James Kenyon,** 73, president of Tremont Nail Co., Wareham, Mass., for the past 20 years, died Dec. 25.

• **Charles B. McElhany,** 72, formerly vice-president and general manager of sales of Cambria Steel Co. and later vice-president of the American Steel Export Co. before he retired, died Jan. 4.

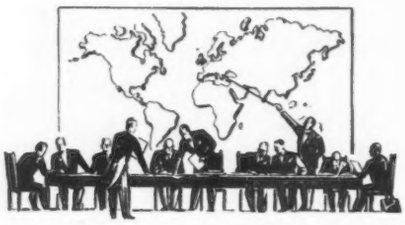
• **Harry H. King,** works manager of the J. Stevens Arms Div. of the Savage Arms Corp., Utica, N. Y., died Jan. 1. He became associated with the company in 1927.

• **William M. Neckerman,** 72, vice-president in charge of pipe, Republic Steel Corp., Cleveland, died Jan. 5.

• **Frank Alborn,** 69, former chief engineer, White Motor Co., Cleveland, died Jan. 4.

European Letter . . .

• Turkish government intends to establish a clear division between state planning and private enterprise . . . Emphasis begins to shift from rearmament to reconstruction . . . No place for American private investor until spirit of private enterprise is developed.



LONDON—The political climate in Turkey between East and West is growing steadily milder under gentle dollar showers and breezes of approval from the West. For some time the aging Republican People's Party (RPP) stood up to the Democrats' pelting without much obvious sign of strain. But suddenly last September the crusty old diehard Premier, Recep Peker, was brought down by nothing deadlier than a backbenchers' rebellion and the President's announcement of his personal neutrality in party politics. And after brief negotiations, a more moderate RPP Cabinet moved in under the previous Foreign Minister, Hasan Saka, a westernized ex-diplomat being appointed to the Foreign Office.

Outwardly the change did not differ much from the customary periodic "changes of the guard" of Atatürk's day. No open concessions to the Democratic Party's demands were made. But the very fact that public criticism, no longer so easily suppressed by newspaper bans and arrests, could undermine an RPP Cabinet and overthrow it with the collusion of its own official chairman, Ismet Inönü, was sensational enough. The ruling party had clearly become unsure of its support in the country and of its hold on the President—a fact which throws a curious light on the controversial election returns of 1946, which gave the RPP a majority of 85 pct.

The new government's program, announced at a special session of the Assembly on Oct. 13, is more remarkable for its discreet overtures to American capital than for its platonic tributes to the democratic form of government, or its reaffirmation of the "middle-of-the-road" principle in domestic and foreign politics. Announcing the government's intention to establish a clear division between state planning and private enterprise—in itself an important though oblique concession to economic liberalism—the Premier alluded briefly to various public investment plans. He mentioned irrigation, electrification, mechanization of mining, construction of roads, railways and ports, and drives for increased agricultural productivity and industrial efficiency. He ended with an unemphatic invitation to foreign capital and foreign specialists.

TO APPRECIATE the full meaning of this gesture, one must call to mind the fierce economic nationalism hitherto practiced by Republican Turkey, and the sad fate which in the twenties and thirties overtook foreign companies in Turkey. Their profits were restricted, frozen, and taxed out of existence, and their fixed capital was finally nationalized for a nominal compensation. But it was soon found that the nationalist projects of industrialization could not make headway without foreign capital, however much the controls and guarantees associated with it might offend nationalist pride and smack of the capitulations of the hated past.

The political situation which produced the American loan seemed to offer, incidentally, a dignified way out of the straits of nationalist economics. Closer relations with the one Power not suspected of imperialist designs and addicted to *laisser faire* principles would make the return to a regime of capital imports and freer trade a plausible move. In 1947 even a Kemalist could make it without loss of face. But as American aid enters upon the phase of execution it seems to be undergoing a subtle change in character, which is worth analyzing more closely.

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President Truman's speech in March had been belligerent. Many listening Europeans must have been troubled by uneasy memories of the luckless British "guarantees" of 1939. A few people in Turkey more vividly recollected the secret withdrawal of the Turkish armies to shorter interior lines at the height of the Azerbaijan crisis of 1946, which, unknown to most, was the real climax of the Russo-Turkish war of nerves.

To all alike the loan was a strategic move, and for 3 months or so following its uneasy beginning the military aspect monopolized comment in Turkey and elsewhere. What information was published referred to war equipment and strategy — AA guns, rapid-firing arms, motor transport, mechanization of the Army, fortification of the Straits. U.S. Army and Navy missions followed one another in close succession, and Turkish staff delegations, the latest under the Chief of Staff, Gen. Salih Omurtak, commuted between Ankara and Washington.

IT WOULD be wrong to deduce from this picture that Turkey has jettisoned all former allies and is leaning exclusively on the United States. While American buyers are purchasing the equipment on behalf of the Turks, and American instructors are teaching them how to use it, the military, naval and air missions which are responsible for the overall training of the Turkish armed forces are, as they have for long years been, British. Hence General Omurtak's recent visit to Britain also. It would be difficult to find anywhere a better sample of Anglo-American dovetailing than that which is to be seen in Turkey today.

Much of this emphasis on military first-aid was accounted for by the natural desire felt here at the time to make martial gestures in a northerly direction. But as American parties landed at Turkish ports, traveled on Turkish railways and roads, inspected Turkish farms, mines and factories, they learnt that the ports could not handle the

material they proposed to send; that the road system would have to be rebuilt before a modern army could deploy; that there was no industry capable of sustaining the efficient war machine to be created.

Gradually the Soviet menace seemed to recede from Turkish minds and the emphasis began to shift from guns and trucks to ports and roads. American delegations called at the Ministries of Public Works and Communications. They were told that the new 5-year plan of industrialization, only one of several big public projects, would alone increase road traffic by an estimated 500,000 tons per year. But the latest road construction plan of the Ministry of Public Works showed that, even on paper, it would take 15 years at the planned annual expenditure rate of $14.3 million to construct and repair the 12,500 miles of highway required to raise the Turkish network to the average European level of 100 years ago.

The Americans inspected ore mines—without smelting furnaces; new blast furnaces—without coke ovens; potential oil fields—without wells. They carried off the impression of an undeveloped, inexpertly striving country, rich in economic potential and paper planning, but lacking capital, skilled labor and engineering, and above all, economic common sense and organization.

THE whole setup must appeal strongly to the pioneering free-enterpriser concealed under many a U. S. Colonel's uniform. On the Turkish side, too, powerful influences are working in favor of a translation of a larger part of the aid from purely military into general economic terms. Indeed, the flexibility achieved in the wording of the Aid-to-Turkey Agreement of July 12 is such that no formal obstacle opposes such a transformation.

Yet owing to the international situation, and to the demands that arise from Turkish military circles on account of it, no one can at present contemplate a large-scale transfer of funds from the rearmament to the reconstruction category. The proportion of the whole at present allocated to communications, as opposed to strictly military requirements, is, at a guess, not much more than 5 pct.

The answer to the "powerful influences" described above is, clearly, that they must attract other American investment. But the American private investor is wary. He has plenty of fields for his activity that are both nearer home and less at the mercy of political accident. Further, in spite of President Inönü's recent vague call to foreign capitalists, the inducement to the foreign investor to sink money in Turkey is still negligible.

During the summer of 1947, the American Twentieth Century Fund conducted a private inquiry into Turkey's resources and potentialities. (The Fund is an American concern privately endowed by philanthropists who have an eye to the future of American business overseas.) Its report, which was prepared by Professor Thornbury and Mr. Graham Spry, is not yet out, but the former disclosed some of its key points to the Turkish newspaper *Vatan* before he left the country in July. In this interview, Professor Thornbury reveals, amongst other facts, that, owing to the lack of public encouragement to the private investor the somewhat shocking total of $285.8 million-worth of Turkish savings is immobile in State Bonds and in savings accounts. He concludes his remarks as follows:

> "It is obvious that as long as the spirit of private enterprise is not developed in Turkey, there is no place for United States private enterprise in your country. First of all you must exploit your own natural resources, and then you can receive foreign capital."

Some Turks, naturally enough write off his attitude to private enterprise as "just what one would expect of an American;" nevertheless his criticism of a state enterprise which is practiced with seldom or never a pause to review costs is worth their attention. The Turks are certainly anxious to obtain financial help for their national development schemes, and the Export-Import Bank, or an extension of intergovernmental aid, may provide it. But the plans will have to be recast and coordinated so as to make sense to men who are used to thinking in terms of cost, efficiency and optimum returns.

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CALL FOR STEEL: *Second only to the British mines' call for men is the miners' call for steel—to mechanize British mines. Here awaiting shipment are diesel locomotives for main haulage ways. Their exhaust systems are claimed to be flameproof and harmful fumes are not released into the pit.*

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Industrial News Summary...

- **Steel Output Reaches New High**
- **Scrap Prices Unaffected by Talk**
- **Customers to Pay More for Steel**

WITH steelmakers screaming about the lack of scrap and attempting everything short of a soap box oration to keep scrap prices down, the industry this week will produce steel at a new peacetime high. If the rate this week was computed on an annual basis, yearly production would amount to more than 89.5 million tons of steel ingots, a figure not reached since the all-time high in 1944.

Some openhearths are shut down throughout the country but it remains a matter of opinion as to whether they are idle because of the scrap shortage or because of normal repair cycles. There is not one iota of doubt, however, that major steel firms are still boycotting the free scrap market and are well on their way in the second round of a buyers' strike against current scrap prices. This action, plus propaganda to the effect that scrap prices are too high, has not caused a significant decline in scrap prices.

It has been at least 3 months since large tonnages of scrap have been purchased in the open market by major steel producers—at high prices. Since that time steel company scrap buying has been unimpressive, and quotations have sagged slightly. Current scrap prices, however, remain in suspension and any large tonnage purchased by a major steel company would have to be consummated at a figure higher than this week's quotations.

MUCH of the scrap which steel companies have failed to purchase in the open market in the past several months has found its way into steel foundries. Faced with a lack of scrap business from big steel firms, scrap dealers have been forced to turn their effort to foundries and other channels. A reflection of this activity is the average price of No. 1 cast iron scrap this week at Pittsburgh, Philadelphia and Chicago which amounts to $60.83 a gross ton or almost $20 a ton more than the average price of pig iron.

Steel producers this week raised the price of nails between $9 and $10 a ton and also raised some other wire products. It is estimated that on the basis of production expected this year wire and nail consumers will pay about $15 million more than they did in 1947. No important base prices were increased within the past week but extra charges on cold-rolled sheets have been advanced in many cases. This latest increase in extra charges (specific charges for certain chemical or physical characteristics which are added to the base price of the steel product) falls on the heels of substantial increases in extras for alloy steel bars which went into effect a few weeks ago. It is also expected that extra charges on carbon bars will be advanced soon. The sum total of these extra changes has been to increase the price of steel to many consumers who specify those extras which have been advanced. Most steel consumers will be affected one way or the other.

One large steel producer which had been quoting galvanized sheets at $2 a ton below the majority of producers of this product has now met the higher price by raising its quotations $2 a ton. It may take the same action on some other flat-rolled products which it had been selling below the majority price.

Whether or not steel companies are making up a large part of increased steelmaking costs by raising extras remains to be seen but these increases represent actual returns which will compensate to some extent for higher steelmaking costs. Steel consumers may definitely look for higher base prices if steel labor wins an increase in wages—as it is expected to do.

RAILROADS are expected to pay almost $8 million more this year for steel wheels, axles and tie plates. Steel wheels have been advanced $8 to $15 a ton, axles $8 a ton and $12 a ton for tie plates.

A large motor car maker last week was embarrassed by his plan of adding one new car to each dealer's quota for every ton of scrap which that dealer supplied. The original plan anticipated that the dealer would do his own collecting around his shop and neighborhood. Some of the smart ones, however, went into the open market and purchased scrap in some cases at a figure much higher than the current quotations. As soon as the company heard this, attempts were made to keep their dealers out of the scrap market. The bonus plan of one additional car on dealer's quotas for each ton of scrap, for which the company will pay, has not been recalled.

No action has been taken yet on iron ore prices but an increase of $2 or $3 a ton is looked for. Talk of such an increase has encouraged importers to speculate on the advantages of larger ore imports now held to a minimum by current ore shipping costs.

Steel customers this week were not finding it any easier to get steel supplies. Having had their first quarter quotas cut, it was now certain that flat-rolled shipments in the second quarter would fall below the expectations of most customers.

The steel ingot rate this week based on the 1947 capacity figure is up ½ point to 98.5 pct of capacity. When the new figure on steel capacity as of Jan. 1, 1948 is computed this week's ingot capacity figure will probably be revised downward to about 96 pct. This will have no effect on the amount of steel produced.

• **$300 MILLION CREDIT**—A credit of $300 million has been extended to Canada by the Export-Import Bank for the purpose of buying United States industrial equipment and raw materials. Expenditure of the money will be divided equally between equipment and materials. Under the latter category, present schedules provide for the import into Canada of $50 million worth of coal, $30 million worth of raw cotton, $20 million worth of chemicals, $20 million worth of non-metallic minerals, and $20 million in miscellaneous raw materials.

• **BLAST FURNACE**—A 10-year lease of the Gadsen government-owned blast furnace to Republic Steel Corp., has been effected by WAA. It will be blown in just as soon as repairs, which have been under way for some time, are completed. Rental terms are to be calculated on a per net ton production basis with a minimum payment of $15,000 a month for the first 3 months of operation. This is to be raised to $20,000 a month thereafter. Original cost of the furnace was around $12,113,000 and the present appraised value is $10,379,000.

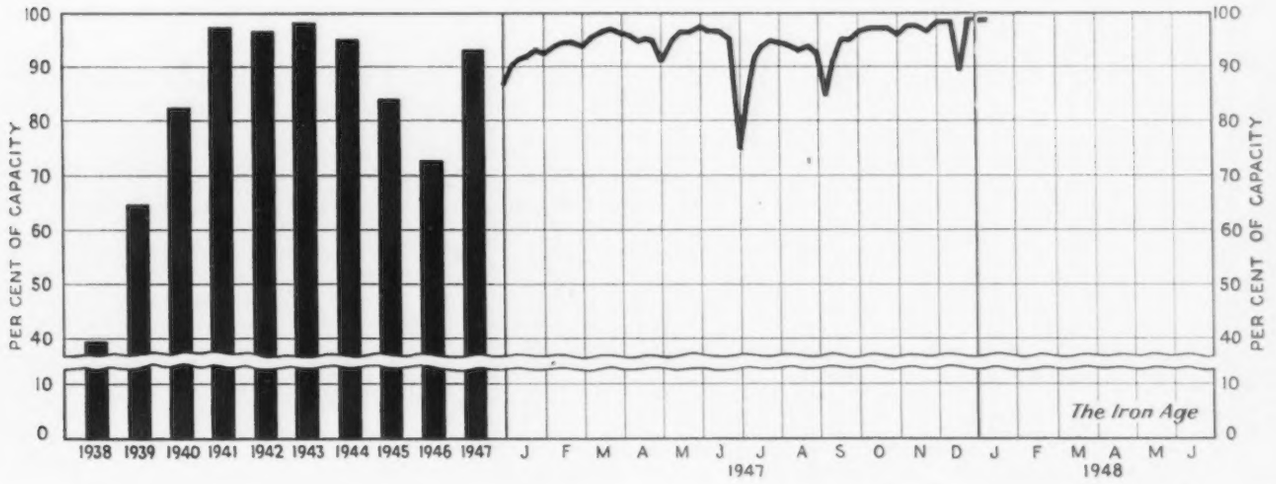
• **MINORITY REPORT**—The report of the Senate small business committee on steel supply (see Washington column this issue) is an "empty gesture," since the investigating group "fails to come to grips with the problem of insufficient steel capacity," Senator Murray, D., Mont., charges. Senator Murray, an advocate of government-financed expansion of capacity and minority member of the committee, declared that the report "offers no findings or recommendations tending to provide an effective program to meet the needs of small and independent business for dependable and sufficient supply of steel. The real root of the present difficulties is found in the monopoly character of the steel industry itself," Senator Murray added, "but the report fails to suggest that this situation be studied and reported on. Regarding a proposed study of distribution practices by the Federal Trade Commission, he criticized the report for failure to recommend a budget for carrying out such a study. Any effective plan to eradicate the vicious gray market will have to provide more teeth than the voluntary scheme proposed in the report," he stated.

• **STEEL EXPANSION**—Expansion and improvements in the steel industry completed in the past year or now scheduled for completion in 1948 and 1949, will add nearly 5 million tons to the steel ingot capacity, which the country had Jan. 1, 1947, according to Walter S. Tower, president of the American Iron & Steel Institute. During the past year alone steel ingot capacity in the United States has increased by almost 3 million tons to a total of 94,233,640 tons, Mr. Tower said. Two million more tons of new capacity are planned for completion during the next 2 years, he added. Blast furnace capacity was increased nearly 1,730,000 tons during 1947 and as of Jan. 1, 1948, is rated at 67,438,930 tons a year. Steel company plans for 1948 indicate a further increase in blast furnace capacity of 2,924,000 tons this year, and an additional 476,000 tons is planned for 1949. Coking capacity has been increased to a record high level and further increases are scheduled for 1948 and 1949.

• **TOP STEEL PAYROLL**—During the first 11 months of 1947, salaries and wages paid to employees of the steel industry totaled $1,811,378,000, more than paid out in any previous peace or war year by the industry. The figure slightly exceeded the $1,745,019,700 paid out in the peak war year of 1944. Payments to wage earners alone for the first 11 months of 1947 at $1,454,193,000 topped the total wages of $1,208,259,000 paid to steelworkers in 1946, by 20 pct or $246,000,000.

• **U. S. STEEL EXPANSION**—U. S. Steel Corp. now has a steelmaking capacity of 31,226,200 net tons. According to B. F. Fairless, president, this is a net increase of 3,431,200 tons or 12.3 pct since Jan. 1, 1940. The Corporation is now in the course of installing an additional 300,000 tons of steel capacity not included in the above figures. Actual increases in steel capacity during the last 8-year period have amounted to 7,537,600 net tons. The difference between the actual increase and the net increase shown above represents retirement of obsolete equipment and the sale of U. S. Steel properties.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 6	104.5	93.5	93.0	93.5	95.0*	102.0	99.0	102.0	97.0	113.0	96.0	89.5	94.0	98.0
January 13	104.5	95.5	93.0	93.5	95.5	102.0	100.0	103.0	101.0	95.5	110.0	89.5	96.5	98.5

* Revised.

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AMERICAN PHILLIPS *Screws*

ALL TYPES

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Steel Gray Market More Active as Inquiry Starts in Washington

Recent Cuts in Mill Quotas, New Freight Increases Add Fresh Impetus

New York

• • • **The high-priced** steel market is getting more active while a new investigation starts on its way in Washington. Recent cuts in regular mill quotas and the new freight increases are driving more consumers to arranging their own steel processing, and to buying steel from brokers at $150 to $300 per ton.

To combat the two-price system in steel, Congress is sending forth a lamb, armed with a dull penknife. Chairman Macy of a House public works subcommittee is starting out bravely, stating that he has "the names of a dozen operators" and that the investigation will "get down to specific cases in the near future" and that "we will get out subpoenas for them."

Allah be praised!

The steel men were called to Washington again last week (invited is probably more precise) to explain the gray market in steel. This time to a new Congressional committee that has evidently made little use of the evidence turned up earlier this year by another committee.

But the activity in Washington has served to drive the boldest gray market brokers more or less under cover. Caution is the watchword until the heat is off. No one wants to get any files tied up by a subpoena—everyone is talking business on the telephone, or in person, these days. Of course the man mixed up in a deal of which he isn't particularly proud is anxious to get a broker to cover up for him. So the steel brokerage business is looking up, thank you.

But the gray market operators aren't the only ones getting worried. Steel companies are deeply concerned about a broad question of ethics in gray market-v.-conversion deal. Large steel producers are violently opposed to calling the bulk of conversion steel anything but that. They say it is unfair to lump this substantial tonnage in with that sold at high prices and call it all "gray market" steel.

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To the steel executive, "gray market" implies moral wrong. Almost every major steel producer that is able to do so is rolling steel on conversion arrangements. Many have said so publicly. That this steel often costs the consumer as much as that acquired in outright gray market purchases is beside the point, they argue.

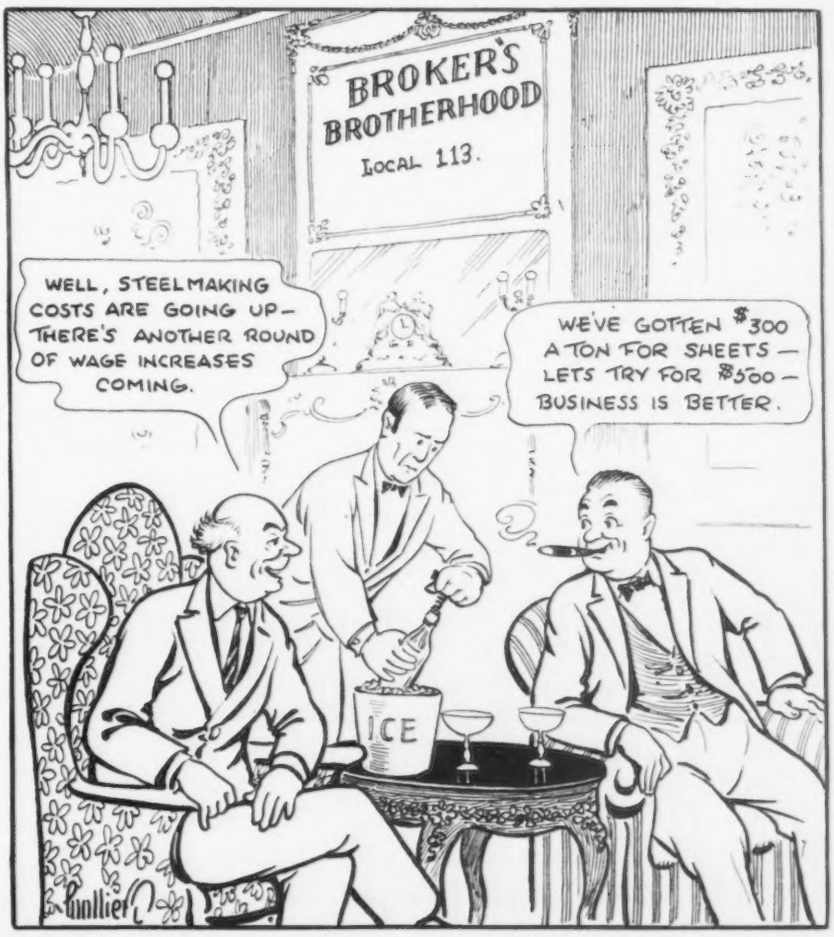
Asked where they draw the line, the reply is this: When a fabricator buys ingots from one source and ships them to one or more mills for production of flat-rolled steel, he has made a conversion arrangement. They don't even like the word "deal." It smacks of wrongdoing.

Steel producers stand on the principle that conversion steel means the wider utilization of existing rolling capacity. The principle is basically correct, but is frequently being abused.

Large steel producers are now charging $20 to $25 for rolling slabs to hotrolled products; $30 to $35 from slabs to cold rolled; ingots to slabs, $10; they make very clear that no scrap allowances are included in any of these deals.

Ask a consumer with an inadequate allocation from a steel mill, or none at all, what he thinks of the above—he'll just hold his nose. Many consumers who have been driven to the gray market for

Ready for the Next Round


BROKER'S BROTHERHOOD
LOCAL 113.
WELL, STEELMAKING COSTS ARE GOING UP— THERE'S ANOTHER ROUND OF WAGE INCREASES COMING.
WE'VE GOTTEN $300 A TON FOR SHEETS— LETS TRY FOR $500— BUSINESS IS BETTER.
ICE
Gunlier

steel are sure that the classic theory that big producers cannot afford to deal in the gray market is the bunk.

Rumors are plentiful—Embittered stories holding steel producers up to ridicule among consumer circles are as fashionable as Mae West gags were a few years ago. In these fairy tales steel company executives are reported to be warning their more casual fellow operators to be a little more discreet lest the whole game be ruined—reported to be setting their sons up in the warehouse business with healthy allocations—reported to be getting mixed up with ex-Murders, Inc., executives for mutual gain.

On the other hand, in steel producing circles the good word is, just let them subpoena the records of some steel consumers, THEN they'll find out where the gray market really starts from.

Steel producers are just beginning to be willing to divulge the steps they are taking to reduce the operations of the gray market. The program disclosed to THE IRON AGE by Inland Steel is a fairly typical example of those steps:

(1) Inland sells to manufacturing companies only and will not sell to any manufacturing company unless they can be assured the steel will be used by the consignee. (2) Inland will not sell to brokers or jobbers, and this includes, of course, warehouses. (3) Inland's conversion sales are made only to old customers who have a prewar history with the company. (4) The size of the conversion tonnage they are willing to handle for old customers is in proportion to that particular company's quota. (5) A condition of sale written on the order and acknowledgment is that the steel being shipped after conversion is for the customer's own end consumption. (6) Terms of sale by Inland are identical to all their customers getting conversion tonnages. The cost may vary because of the different prices of semifinished but using the price of semifinished as a base the approximate cost for Inland to make the same item is the corrected cost paid for the incoming

AMERICAN IRON AND STEEL INSTITUTE
SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING ALLOY AND STAINLESS
(Net Tons)

NOVEMBER - 1947
Month

Steel Products	Number of companies	Items	Current Month: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Current Month: Per cent of Total Shipments	Current Month: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	To Date This Year: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	To Date This Year: Per cent of Total Shipments	To Date This Year: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Whole Year 1946: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products For Resale) (Net Tons)	Whole Year 1946: Per cent of Total Shipments	Whole Year 1946: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	43	1	274,244	5.3	211,294	* 2,783,475	4.8	2,020,308	1,949,624	4.0	1,645,748
Structural shapes (heavy)	13	2	353,384	6.8	41	* 4,056,515	7.0	2,599	3,474,284	7.1	5,399
Steel piling	4	3	26,765	0.5	-	295,513	0.5	23	205,313	0.4	141
Plates (sheared and universal)	29	4	513,000	9.8	17,841	5,754,439	10.0	201,395	4,152,181	8.5	250,709
Skelp	7	5	12,460	0.2	37,416	152,214	0.3	366,615	227,033	0.5	194,666
Rails—Standard (over 60 lbs.)	4	6	194,164	3.7	-	2,016,901	3.5	991	1,790,311	3.7	4,890
—All other	5	7	14,459	0.3	-	190,920	0.3	329	144,999	0.3	426
Joint bars	7	8	10,501	0.2	1,248	160,674	0.3	14,671	176,803	0.4	5,327
Tie plates	9	9	34,230	0.7	-	460,408	0.8	4,137	447,496	0.9	18,700
Track spikes	8	10	10,957	0.2	22	151,931	0.3	96	146,194	0.3	693
Hot Rolled Bars—Carbon	34	11	493,961	9.5	57,334	* 5,721,443	9.9	672,123	5,006,859	10.3	707,991
—Reinforcing—New billet	15	12	106,828	2.1	153	1,165,199	2.0	8,788	1,048,483	2.1	7,381
—Rerolled	12	13	15,945	0.3	-	160,070	0.3	-	141,346	0.3	1,267
—Alloy	27	14	137,276	2.6	15,053	* 1,598,121	2.8	193,314	1,390,278	2.8	138,395
—Total	45	15	754,010	14.5	72,540	8,644,833	15.0	874,225	7,586,966	15.5	855,034
Cold Finished Bars—Carbon	29	16	99,857	1.9	634	1,325,012	2.3	8,612	1,316,579	2.7	2,428
—Alloy	26	17	14,589	0.3	269	202,354	0.4	2,257	196,237	0.4	1,725
—Total	35	18	114,446	2.2	903	1,527,366	2.7	10,869	1,512,816	3.1	4,153
Tool steel bars	19	19	6,215	0.1	42	80,871	0.1	1,266	96,020	0.2	371
Pipe & Tubes—Butt weld	15	20	149,055	2.9	6,095	1,552,327	2.7	63,273	1,276,289	2.6	45,393
—Lap weld	8	21	30,970	0.6	24	357,081	0.6	821	305,516	0.6	238
—Electric weld	11	22	114,124	2.2	29	1,015,726	1.8	2,013	674,459	1.4	591
—Seamless	10	23	170,664	3.3	12,980	1,889,914	3.3	128,014	1,871,540	3.8	83,441
—Conduit	7	24	14,070	0.3	727	140,177	0.2	7,849	98,521	0.2	2,448
—Mechanical and pressure tubing	13	25	55,557	1.1	1,763	604,576	1.1	18,798	429,180	0.9	3,478
Wire rods	22	26	56,125	1.1	26,201	616,924	1.1	304,624	679,998	1.4	346,506
Wire—Drawn	39	27	216,033	4.1	15,896	2,360,384	4.1	166,347	1,933,124	4.0	135,592
—Nails and staples	18	28	64,120	1.2	878	739,107	1.3	7,868	636,632	1.3	797
—Barbed and twisted	15	29	21,962	0.4	-	233,465	0.4	68	207,610	0.4	-
—Woven wire fence	13	30	33,052	0.6	296	377,118	0.7	3,414	383,230	0.8	-
—Bale ties	12	31	8,969	0.2	-	110,013	0.2	-	99,993	0.2	-
Black Plate—Ordinary	9	32	64,989	1.2	35	729,056	1.3	1,888	781,167	1.6	3,179
—Chemically treated	8	33	557	-	-	18,264	-	-	125,170	0.3	-
Tin and Terne Plate—Hot dipped	9	34	178,905	3.4	-	1,893,998	3.3	228	1,924,657	3.9	-
—Electrolytic	9	35	148,599	2.8	-	1,447,063	2.5	329	909,173	1.9	-
Sheets—Hot rolled	31	36	620,770	11.9	49,450	* 6,634,151	11.5	* 525,006	5,521,463	11.3	421,198
—Cold rolled	17	37	463,543	8.9	1,951	4,957,847	8.6	24,620	4,075,554	8.4	3,397
—Galvanized	16	38	130,304	2.5	64	1,471,205	2.5	720	1,462,053	3.0	1,725
—Electrical and enameling	10	39	49,799	1.0	-	533,555	0.9	385	435,170	0.9	-
Strip—Hot rolled	23	40	137,158	2.6	28,201	1,591,093	2.8	276,925	1,363,812	2.8	237,176
—Cold rolled	34	41	126,161	2.4	1,671	1,478,567	2.6	25,354	1,282,146	2.6	25,904
Wheels (car, rolled steel)	5	42	28,451	0.5	-	328,654	0.6	2	252,308	0.5	348
Axles	5	43	14,218	0.3	-	167,564	0.3	53	130,461	0.3	221
All other	-	44	-	-	-	-	-	-	6,266	-	-
TOTAL STEEL PRODUCTS	142	45	5,216,990	100.0	487,608	*57,523,829	100.0	*5,056,323	48,775,532	100.0	4,297,889

During 1946 the companies included above represented 99.5% of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Adjusted.

semi with an allowance of expense in handling and heating and making the finished product.

These commitments set up a good general policy. They are admittedly hard to assure under all conditions. There are some loopholes in almost every one. But in the absence of legislation to back up the producer—or private police forces—more powerful action is difficult.

In recent weeks the high priced steel sphere has become more definable. It has some of the attributes of a consumer cooperative, of buccaneering, and of the comic opera. Companies which need steel badly, and can afford to pay high prices for it, and handle their purchasing like a treasure hunt, are able to get it. There are companies in this circle which have worked into the gray market and conversion deals to a point where they are glutted with steel.

Regular purchasers in this line in many areas develop into friendly cliques—no one ever gives up a mill quota these days if an excess tonnage of one product is obtained by hook or otherwise—the astute purchasing agent calls his friends to see what kind of swap he can arrange. If no desirable swap is seen—he may then call in his gray market broker—put it up for sale at a high enough price to cover his most recent steel losses.

In general, gray market and conversion price levels are still strong, with a general expectation, particularly in the Middle West, that sheet prices will go still higher.

There are at least three levels of ingot prices at the moment. One price is negotiated at about $90-$95 per ton, when no scrap nor splitting of finished products is involved. Under this arrangement the ingot producer must buy its own scrap. There is another price level for ingots at about $75 to $85 per ton, in which the purchaser of the ingots furnishes the melter with a specified scrap tonnage. There are others that sell ingots on the basis of published prices—plus other material consideration. This last group in some cases demands the required scrap for the ingots; and then a cut in the sheet or strip end product.

This sheet at the end of the deal is a fine piece of gravy indeed. If it goes to a man who is normally only an ingot seller, he is out for all he can get in selling it. He has no long term interest in the sheet business. He just goes out for the fattest wad he can get. For mills which are normally in the sheet business, they must be much more circumspect.

Sheet bar business is ranging up to a late quotation for ⅝ in. thick by 12 in. wide at $70 plus 110 pct of THE IRON AGE scrap quotation. This company puts itself in an ideal position in the troubled scrap market. It demands and uses slightly better scrap than is being sold as No. 1 in the present market. Selling contracts based on 110 pct of going quotations gives the firm enough of a margin to bring out hard to get scrap and to demand the very best available.

The only encouraging note that THE IRON AGE has been able to find in the gray market situation is a current quotation of 6 to 6½¢ per lb for carbon strip in the Chicago area.

Motor Car Company Innocently Embroiled in Scrap Market

Dealers Hustle for Scrap To Get Cars Added to Quota But Plan Backfires

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By BILL PACKARD
Associate Editor

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New York

• • • **The latest gimlet** in the long, grim struggle of automobile producers to obtain more scrap, and ultimately more steel, is a policy of trading cars for scrap. The Packard Motor Car Co. has just such a program in effect with its dealers now.

Packard has launched a scrap reclamation program which makes every car dealer in the far flung organization a potential source of scrap for the company, as well as a potential scrap dealer. The program was designed to furnish an incentive to dealers to turn in all available scrap to the company. A dealer receives an additional car in his quota for every ton of scrap he obtains for the company. The company also pays the dealer current market price for the scrap.

Results indicate that the program is succeeding far beyond the fondest dreams of the company. In fact, the success of the program is so great that the company is placed in the position of being embarrassed by its own success.

In the face of a huge backlog of clamoring customers, as well as an opportunity for more profit by selling more cars, dealers have proven themselves to be overanxious in their quest for scrap—sometimes at any price. The dealer can well afford to buy scrap at prices in excess of current market quotations and sell it to the company at a small loss. He still gains the profit on a new car, in addition to satisfying a customer, for every ton of scrap which he handles in this manner.

Meanwhile, scrap dealers have told THE IRON AGE that automobile dealers have entered the scrap market, offering amounts in excess of current market price for the scrap. One large scrap dealer said that the scrap market is so uncertain that he is doing business more conservatively than ever before. He said that he would not agree to deliver a single ton of scrap that he did not already have in his yard.

To say that automobile dealers have created a furor by purchasing scrap in the open market is putting it mildly. It is known definitely that some auto dealers have purchased scrap at prices in excess of the current market price. This at a time when the scrap market is being severely tested. So far the tonnages purchased in excess of current mar-

ket prices have not been sufficient to drive the market upward. But people in the scrap industry are definitely worried about this development.

In explaining Packard's policy to THE IRON AGE, a company spokesman said that the company had never intended for its dealers to enter the scrap market to obtain scrap to trade for additional cars. He stated that the company had launched the program of trading cars for scrap in order to provide dealers with an incentive to turn in all scrap which they might have about their premises, as well as any other scrap which was not currently in the market.

He explained that it was fantastic to suppose that the company would be able to trade cars for all the scrap which could be bought in the market. He also said that the company was already taking steps to prevent its dealers from entering the scrap market.

This latter statement is borne out by the fact that scrap dealers in one area, who had previously complained of Packard auto dealers entering the scrap market and paying premium prices for scrap, now state that the dealers have withdrawn from the market. At the same time, dealers in another area, who have been facing the same competition, give no such reassuring report.

Meanwhile, General Motors is reported to be planning to launch some kind of company scrap drive among its employees late this month, although the exact nature of the plan is not yet known.

A study of 1947 production figures among auto producers (THE IRON AGE, Dec. 11, p. 133) revealed that producers owning steel plants, or arranging for conversion deals, had by far the best production records. This might explain the feverish efforts of auto producers to obtain scrap, or anything else that can be converted into steel.

Higher Freight Car Goal Still in Talking Stage; 10,000 Cars Due Soon

Pittsburgh

• • • **The 14,000-freight** car a month program is still in the talking stage. But there are good prospects of ironing out unbalance in first quarter steel allotments to assure success for the 10,000-car program. This was the gist of Washington meetings on the subject held Jan. 6 and 7. Meeting with Office of Defense transportation officials were the steel industry and freight car builders task committees and representatives of the railroad shops and component parts producers. Another meeting will be needed soon to line up second quarter steel allocations.

We wanted, an ODT spokesman said, to see how allocations under the 241,000-ton monthly goal were being placed. He said ODT found "that some car building shops were over their allotment and some were under. . . . There are still some heavy shortages at some shops and we've got to figure out a way to take over-supplies away from those who have too much. The 14,000-car goal was discussed and we are agreed that it can be met."

Last year saw no 10,000-car month. December came closest when car builders made 7661 units and railroad shops 2142, for a total of 9803 cars. Industry observers believe 1948 prospects for 10,000 cars a month are excellent. But they doubt that a 14,000-car-a-month program can be attained. They do see 12,000 cars in some months as a possibility if the program is stepped up sharply.

The independent car builders assert they can turn out their share of a 14,000-car-a-month program. But theirs is an "iffy" assertion. They can do it if they get the steel, have no strikes, no acts of God to intervene, and secure adequate labor. The last, according to well informed observers, is the high hurdle. Another obstacle is said to arise from the length of time a shop can run on a specific type of car. Capacity of a car shop, like that of a steel bar mill, depends on how long it can run without a change in specifications. The car order pattern vitally affects total output. Actual capacity rarely equals rated capacity.

At their present rate the car builders and railroad shops have a year's orders on hand. Most are booked solid but three shops are reported open for some additional business in the last 4 or 5 months of 1948. About 20,000 cars are now in the inquiry stage. Two roads alone, the New York Central and the Southern Pacific, account for three fourths of this total. For the latter reason some steel company railroad materials men believe this may herald the placing of more than 100,000 new car orders. Because of the planning and scheduling involved they think it about time the roads started ordering for 1949.

PRIME MOVER: *Bell Aircraft Corp. introduced this new materials handling device at the 2nd annual Materials Handling Exposition in Cleveland this week. The prime mover, capacity 1000 lb, has a 3 hp air-cooled engine and operates for 8 hr on 3 gal of fuel. All moving parts are enclosed.*

Voluntary Allocation Plan Hearings Scheduled for Early February

Washington

• • • **The first voluntary** allocation plan covering steel will not be ready for public hearings until some time in early February, according to present Dept. of Commerce schedules. In fact, Commerce Dept. officials who attended the steel industry meeting called by Secretary Harriman told THE IRON AGE that this date is "highly optimistic," basing their views on the preliminary character of the January 8 meeting and the fact that a formal steel industry advisory committee has not yet begun to function.

Seventeen steel industry executives, after pledging complete cooperation in carrying out the objectives of the Republican-sponsored voluntary control bill, also told Commerce officials that they would submit a panel of top steel men to the department sometime this week so that a formal industry committee may be set up as quickly as possible.

Also announced at last week's meeting was the appointment of John C. Virden, Cleveland electrical goods manufacturer and former WPB official, as director of the newly-created Office of Industry Cooperation. Mr. Virden will head a small group of industry negotiators whose principal job will be to act as contact men between industry and government in carrying out the program. Mr. Virden has asked the steel industry to assign a top executive as the first industry member of his group and the industry has indicated that it will do this immediately.

Scheduling of requirements, bills of materials, and the preparation of detailed statements of justification for individual programs, as well as other administrative details, will be handled by the Office of Domestic Commerce.

While discussion of details was held to a minimum by Secretary Harriman at last week's meeting, some of the problems highlighted by THE IRON AGE (Jan. 8, p. 95) were brought out by industry leaders. Perhaps the most persistent of these was the troublesome question of what is to happen to other steel consumers if freight cars, farm equipment, petroleum equipment, and other so-called essential items are to receive 10 to 15 pct more steel.

Kaiser Plan Not Discussed At Meet With Commerce Dept. and Industry

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Commerce made no direct attempt to answer this or any other detailed question at the meeting, maintaining that such matters would be taken up by the formal advisory committee. Mr. Virden, however, has indicated that Commerce would duck this problem, leaving to the steel industry the problem of deciding which consumers are to get less. Mr. Virden has also stated that Commerce would attempt to allocate all components, etc., if it becomes necessary to up production of these essential commodities. He has emphasized, however, that with Commerce working actively to increase steel output, consumers may not be as hard hit as might be anticipated. Commerce also believes that much of the job may involve trouble-shooting activities in ironing out distribution and utilization problems within the essential industries.

Just before the meeting copies of a proposal by Henry J. Kaiser were distributed urging the creation of an impartial steel anti-inflation commission to hold public hearings on complaints and conduct public investigations into charges of discrimination, sales to the gray market, overpricing, steel hoarding and failure to produce to the limit of capacity. Mr. Kaiser called upon his fellow industrialists to enter a voluntary agreement to distribute products fairly among all customers at reasonable prices, with due regard for the needs of small businesses, new competitors and export requirements.

Under the Kaiser plan each steel producer would pledge to produce as much steel as possible and to join industry-wide efforts to increase overall production. According to Mr. Kaiser, steel production can be increased immediately. The Kaiser plan was not discussed at the meeting.

In going over procedures to be followed in formulating voluntary programs, Commerce officials stated that after it is agreed that a program is necessary for a particular commodity and the fullest justification has been provided by the government, the industry advisory committee would draw up the agreement. Public hearings would then be held to give labor, consumers, and industry an opportunity to express their views.

The agreement would then be submitted to the Dept. of Justice for approval in order to obtain immunity from prosecution under the anti-trust laws. Justice Dept. attorneys would also sit in on the meetings at which the agreements are drawn up. In regard to anti-trust immunity, B. F. Fairless, Pres., U. S. Steel Corp., is reported to have asked if the Justice Dept. could prepare a memo guaranteeing immunity from prosecution during the present formative stages as well as during the life of agreements that will be reached. It is further reported that Justice Dept. attorneys, present at the meeting, said this could be done.

In addition to Secretary Harriman and his top advisers the meeting was attended by officials of the Justice, Interior, and Agriculture Depts. and of the Office of Defense Transportation.

Steel industry leaders present at the meeting included the following:

H. G. Batcheller, Allegheny Ludlum Steel Corp.; B. F. Fairless, U. S. Steel Corp.; A. B. Homer, Bethlehem Steel Corp.; Charles R. Hook, American Rolling Mill Co.; Walter Howell, Bliss & Laughlin, Inc.; Elton Hoyt, III, Pickands Mather; Henry J. Kaiser, Robert C. Elliot, Kaiser Co., Inc.; Adm. Ben Moreel, Jones & Laughlin Steel Corp.; Carl Meyers, Colorado Fuel & Iron Corp.; Frank Purnell, Youngstown Sheet & Tube Co.; Henry A. Roemer, Sharon Steel Corp.; Wilford Sykes, Inland Steel Co.; Ernest T. Weir, National Steel Corp.; C. M. White, Republic Steel Corp.; Walter S. Tower, American Iron & Steel Institute; W. W. Holloway, Wheeling Steel Co.; J. Frederick Wiese, Lukens Steel Co.

State Dept. Recommends Revision of European Steel Requests

Washington

• • • **A much watered-down** version of the European nations requests for iron and steel and steelmaking equipment was presented to Congress last week as the Administration's position on the amounts that can be supplied by the United States under the European Recovery Program.

The major points in the Administration's proposals are: (1) An absolute ban on exports of scrap, (2) exports of only 20 pct of the crude and semifinished steel requested in the Paris report, (3) an increase in the requested amounts of finished steel, (4) exports of about half the $400 million worth of steelmaking equipment requested and (5) a firm stand against the reactivation of the international steel cartel.

The analysis released by the State Dept. reiterates the many reasons for not exporting scrap placing particular emphasis on the reduction in steel production that would be entailed and the effect on domestic scrap prices, which would boost the whole structure of steel costs and prices. It is pointed out

Ban On Scrap Exports, 80 Pct Reduction of Crude Steel Included in Report

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By EUGENE J. HARDY
Washington Editor

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that much the same reasoning led to the reduction of the import requirements for crude and semifinished steel (exclusive of hot-rolled strip) to approximately one-fifth of the CEEC requirements. (See accompanying table.)

For the first year of the program, the Administration would allow the participating countries greater-than-current imports of sheets, though less than the amounts requested, and the full quantity of tinplate requested. Imports of all other finished steel are scheduled for the first year at the current rate, or at about two and a half times the level requested. This increase will make up for the deficiency in European production as forecast by the United States. Imports of finished steel for the other 3 years of the program are also scheduled in excess of the amounts requested.

Shipments of steel as such and steel in fabricated products to Western Europe will involve a total drain of about 4 million tons in each of the first 3 years and 3 million tons in the fourth year, or about 5 pct of current steel ingot output, according to U. S. estimates.

As to steelmaking equipment required for the Western European plant expansion program, it is estimated that total requirements from the United States will probably be only about half the $400 million figure presented by the 16 nations, largely because United States agencies are of the opinion that a substantial portion of the equipment requirements might be supplied out of German reparations.

More complete employment of existing finishing equipment in the CEEC countries is also suggested, since it is realized that even if the optimistic CEEC steel-ingot production expectations are achieved there will still be much unused

Imports of Iron and Steel Products From the United States in 1947, and in 1948-1951[1] as Scheduled for Participating Countries by CEEC and by U. S. Agencies.

(Quantities in thousand metric tons, actual weight)

Product	Estimated 1947	1948		1949		1950		1951	
		Scheduled by CEEC	Scheduled by U. S. Agencies	Scheduled by CEEC	Scheduled by U. S. Agencies	Scheduled by CEEC	Scheduled by U. S. Agencies	Scheduled by CEEC	Scheduled by U. S. Agencies
I. Total weight									
Crude and semifinished steel[2]									
Excl. hot rolled strip	340	1,770	400	1,820	400	1,980	400	1,970	400
Hot rolled strip	[3]	270	250	270	250	270	250	200	200
Finished steel[4]									
Sheet	160	385	215	180	180	31	31	.....	.....
Tinplate	112	291	290	285	285	269	269	250	250
Other finished steel	1,150	449	1,150	neg.	1,235	neg.	1,330	neg.	902
Total finished steel	1,422	1,125	1,655	465	1,700	400	1,630	250	1,152
Scrap	6	1,399	.....	1,753	.....	2,091	.....	2,231	.....
Pig iron	34	182	35	68	35	.....	.....	.....	.....
Ferromanganese	neg.	55	.....	68	.....	78	.....	83	.....
II. Total dollar value (millions)	n.a.	$341	$227	$281	$229	$275	$210	$268	$164

[1] In final outline of the European Recovery Program, the imports scheduled by the U. S. Agencies will relate to the fiscal years 1949-52.
[2] If measured in ingot equivalent these weights would be approximately 15% higher.
[3] Included in export total for sheet.
[4] Excludes for 1948-51 finished steel for use directly in coal mining and scheduled separately in that program. For the entire period this item amounts to 52,000 tons.

finishing capacity, particularly in the United Kingdom and Italy.

In reporting on German steel capacity, it is estimated that there are some 4 million tons available in the bizonal area which is in good condition and ultimately should be available for reparations. The United States claims that the CEEC countries can count on being allocated at least their full quotas of German steel capacity, or just over 50 pct of the total available. Eight months is given as the maximum time required to inform the CEEC countries of available German capacity. After that date the United States feels that such capacity can be counted on in economic planning with virtually the same degree of certainty as can capacity to be supplied through new orders.

As to cartels, it is stated that before assistance is provided "it is necessary to have assurances that such assistance will not be utilized to continue or reinforce European cartels." It is suggested that participating countries submit detailed information on patent licenses, sales, prices, contracts, expansion, etc., so as to insure against resurrection of restrictive cartel agreements.

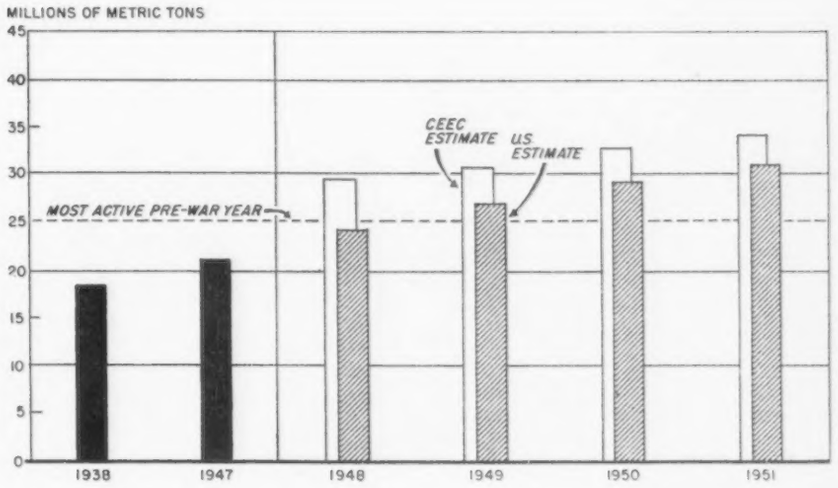
It is further recommended that the Steel Cooperation Committee, called for in the Paris report and which would be made up of the mainstays of the prewar steel cartel, should be limited in its operations to the period of steel scarcity, include steel consuming industries in each country, and report fully to the United States. In fact, the United States would have the power to override decisions of this Committee to avoid any effects adverse to the objectives of the ERP.

Other points made by the Administration report are:

(1) Estimates of available scrap in Western Europe are exceedingly conservative. Estimates of future scrap supplies are too low, particularly in the cases of France, Italy, and the United Kingdom. Efforts to collect scrap should be intensified throughout Western Europe, especially in Western Germany.

(2) Steel ingot production for Western Europe, including Western Germany, is estimated by the United States at about 36.8 million tons, an increase of 20 pct over 1947, as compared with CEEC estimates of 42.3 million metric tons, or an increase of 40 pct. For the remaining years, U. S. estimates approximate more closely those advanced by the CEEC. The reduction by the U. S. was arrived at after considering shortages of scrap, coke, transportation, and manpower, as well as organizational difficulties.

PRODUCTION OF FINISHED STEEL IN CEEC COUNTRIES
1938, 1941-1951



(3) United States estimates of consumption of finished steel are more than 4 million tons under the CEEC estimates for the first year and about 2 million tons under those for the second year. Thereafter, the U. S. estimates conform to those given in the Paris report. However, it is believed that failure to meet CEEC estimates by 13 pct (4.2 million tons) in the first year and about 5 pct (1.8 million tons) in the second will not seriously affect the overall recovery program. The United States also maintains that more extensive data are needed if a detailed analysis is to be made of Western Europe's ability to consume steel.

FTC Opens Hearings Against AISI and 101 Steel Producing Co.'s

Washington

• • • **Admitting that the** outcome of the Federal Trade Commission's price-fixing charges against the nation's steel industry is "keyed to the proof of combination," the Commission's chief attorney in the case, Lynn C. Paulson, opened formal hearings on Jan. 12 by presenting a series of 27 maps showing major producing and basing points in the industry.

The maps, explained by J. W. Adams of the Commission's economic division, were designed to illustrate wide discrepancy between the number of producing points and the number of basing points in the industry.

Industry counsel, numbering between 70 and 80 lawyers from widely scattered parts of the country, were to be given adequate time to examine the maps and confirm or correct them. The basing point data used by FTC were taken from THE IRON AGE of Jan. 1, 1948, while the production and capacity data covering 27 major product classifications was gleaned from the 1945 issue of the American Iron and Steel Institute's directory.

To supplement the material covered in the series of maps, Mr. Paulson requested the industry to submit all base prices and extras for a period ranging from the death of the NRA in 1935 through the first half of 1947. Industry attorneys agreed to furnish this data, but reserved the right to object to the use which might be made of such material.

Those companies making only one or a few of the 27 items covered in the FTC maps may furnish complete price data on those items only, and submit their most recent price lists on other products for

Industrial Briefs . . .

• OPEN HOUSE—Some 5600 people attended the open house held recently by Superior Steel Corp. at Carnegie, Pa., as part of its fifty-fifth anniversary celebration.

• EASTERN OFFICE — Kennametal, Inc., Latrobe, Pa., has announced the opening of its own eastern district office at 6 West Broadway, New York City, for the distribution and servicing of its cutting tools and wear-resistant parts.

• SALES AGENT—Fort Duquesne Steel Co., Pittsburgh, processors and distributors of flat-rolled steel products, has appointed L. D. Catlin, 42 East Ave., Rochester, N. Y., as its district sales representative in Rochester and the surrounding area.

• BUYS HEATING DIVISION—Purchase of the Induction Heating Div. of the Budd Co., Detroit, by the Ohio Crankshaft Co. for its Tocco Div. has been announced.

• AUTO-LITE GROWS—The Electric Auto-Lite Co., has announced the acceptance of the company's bid of $8.4 million for the former Wright Aeronautical plant at Lockland, Ohio.

• ENLARGES WAREHOUSE—Announcement has been made of a large addition to the warehouse of the Amalgamated Steel Corp., Newburgh Mill District, Cleveland, Ohio.

• CHANGES NAME — Nichols Wire & Steel Co., Davenport, Iowa has changed its name to Nichols Wire & Aluminum Co.

• PURCHASES PLANT—The J. I. Case Co., Racine, Wis., has purchased the Kilby Steel Co. plant in Anniston, Ala., which engaged in the manufacture of farm implements.

• SPRINKLER IN CHICAGO—The Automatic Sprinkler Corp. of America will establish its first manufacturing unit in the Chicago area at 5440 N. Wolcott Ave.

• MORE RADIATORS — Excell Auto Radiator Co. of Chicago is constructing a two story addition to its factory which will be used to expand its production facilities for automobile radiator equipment.

• EASTERN AGENT — Joslyn Mfg. & Supply Co. has announced the appointment of James A. Downey as its sales representative for the Philadelphia, Baltimore and Washington districts. Associated with him will be Roy H. D'Ardenne.

• BROWN EXPANDS—Brown Instrument Co. has established permanent sales and service representation at 400 Broadway, Denver, and 437 Atlas Bldg, 36½ West Second South, Salt Lake City.

• OPENS SALES OFFICE — Carbide & Carbon Chemicals Corp. has opened a new sales office at 1527 Esperson Bldg. in Houston.

• MERGER — The merger of Robertshaw Thermostat Co., Youngwood, Pa., the Fulton Sylphon Co., Knoxville, Tenn. and the Bridgeport Thermostat Co., Inc., Bridgeport, Conn., under the name of Robertshaw-Fulton Controls Co., located at Knoxville, Tenn., has been announced.

• MOVING EAST — Harvill Mid West Corp., wholly owned subsidiary of Harvill Corp., Los Angeles, has leased a manufacturing building in Chicago. These new facilities will be devoted to the production of magnesium, aluminum, brass and alloy die castings.

the Commission to make a ruling on their importance to the case.

By combining this material with the data covered in the maps, Mr. Paulson believes that he will have sufficient basic material on which to base the government's case. Trial examiner Frank Hier stated that he will not rule on the admissibility of the maps as evidence until the industry has had an opportunity to examine them and also furnish the requested data.

At the close of the first day's proceedings, Mr. Paulson told THE IRON AGE that they hoped to recess the hearings on Jan. 14 for about three to four weeks. During this interval, the industry would have an opportunity to submit the requested material and FTC would be able to begin an analysis of all pertinent data. He also stated that field hearings would not begin until those in Washington have been completed. Before recessing, Mr. Paulson hoped to submit material bearing on alleged identical bids submitted by the industry for government contracts. This material comprises the government's third group of basic factual matter.

In his opening statement, Mr. Paulson maintained that "The basic charge deals with the basing point method of pricing and the collection and dissemination of freight rate factors in conjunction therewith by the group cooperatively through the Institute. The other allegations go toward rounding out the picture. The refusal to sell f.o.b. mill is an integral part of the basing point practice. For the government, I hope to show that the practices taken together add up to combination and are counter to free competition and independent action."

Ordnance Works for Sale

Cleveland

• • • **War Assets Administration** is taking bids on Keystone Ordnance Works, Meadville, Pa., and Plum Brook Ordnance Works, near Sandusky, Ohio, according to announcement by Harold Mundell, WAA regional director.

According to Mr. Mundell, the two huge explosives producing facilities cost the government $68,875,000.

Weekly Gallup Polls . . .

Voters Favor Limit of 50 Pct on Income Taxes

Princeton, N. J.

• • • **With tax reform** scheduled for early consideration in the new Congress, there is one change which has considerable popular support, according to George Gallup, director, American Institute of Public Opinion.

That change is to put a limit of 50 pct on the proportion of a man's income the government can take in income taxes.

Harold E. Stassen, Republican presidential candidate, suggested such a limit some time ago, and the suggestion was supported by Rep. Harold Knutson, chairman of the House Ways and Means Committee. Mr. Stassen believes it is unfair to require anyone to pay more than half of his income to the government. At the present time, incomes in the higher brackets are taxed up to as much as 86 pct.

The issue of tax limitation was put before the voters of the country in a national survey by the institute, as follows:

"At present, some people with large incomes have to pay more than half of their income in income taxes. Do you think an income tax limit should be placed on large incomes so that no one would pay more than half of his income in federal income tax?"

The vote:

	Pct
Favor limit	50
Opposed	38
No opinion	12

It is to be expected that people who pay the most taxes would be most in favor of the 50 pct limitation. The poll results show that to be true. When people were asked how much money they have to pay annually in income taxes, those paying more than $500 a year are more in favor of the limitation than any other group, their vote being 58 pct in favor, 36 pct opposed and 6 pct without opinions.

But the interesting thing is that even among people who pay very small annual sums in income taxes—below $150 a year—there is sentiment in favor of the limitation on taxing of the well-to-do. This bears out findings in other years that Americans of moderate means are not out to "soak the rich"; in fact, if they set the taxes, the rates would be very substantially less than what Congress now decrees.

•

• • • **California, which has** been the happy hunting ground of the Democrats in national elections for more than 16 years, continues to lean Democratic for 1948, but by a reduced majority. That's indicated in statewide polling by the institute on the party preference of California's voters.

Voters were asked:

"If a presidential election were held today, which party would you vote for—the Democratic or the Republican?"

The vote compares with recent elections as follows:

CALIFORNIA

(Major Party Vote)

	Dem. Pct	Rep. Pct
1932	61.0	39.0
1936	67.9	32.1
1940	58.1	41.9
1944	56.8	43.2
Today	53.5	46.5

Previous reports by the institute have covered five other large states. One has been found leaning Republican; the other four leaning Democratic, as follows:

	Dem. Pct	Rep. Pct
New York	53	47
Pennsylvania	51	49
Ohio	51	49
Illinois	51	49
Michigan	47	53

One of the threats to the Democratic Party in California is a third party ticket which might split the Democratic vote. A third-party movement headed by Robert W. Kenny, Los Angeles lawyer and former State Attorney General, has been causing much smoke and some fire during recent months. Kenny is co-chairman of the Progressive Citizens of America and one of the sponsors of Henry A. Wallace's third party candidacy.

In California a new party, to win a place on an election ballot, must have a petition signed by 10 pct of the total vote cast at the last statewide election. This involves a very substantial number of names. An estimated 275,000 would be required.

California Leans Democratic For '48; Truman Leads Taft In Presidential Trial Heat

o o o

•

• • • **If Sen. Robert A. Taft** of Ohio were to be the Republican presidential candidate running against Mr. Truman, he would run strongest in the East Central section of the country, comprising Ohio—his home state—and Illinois, Indiana and Michigan.

This is shown in a trial heat between Taft and Truman, which also brings out the fact that among the various occupational groups the Ohio Senator is strongest with business and professional people. Among manual workers, and labor union members in particular, however, Mr. Truman runs ahead.

With the election still 10 months off, the recent trial heat between the two men whose views on public issues differ so markedly is inconclusive politically; a great deal can happen in coming months to change the picture. The results are interesting chiefly in showing where each candidate is strongest and weakest today, and what his relative standing is with different groups in the voting population.

A scientifically-selected cross-section of voters in all 48 states was polled on the question:

"If a presidential election were being held today, and Truman were running for President on the Democratic ticket against Taft on the Republican ticket, how do you think you would vote?"

The result nationally is:

	Pct
Truman	55
Taft	33
No opinion	12

Mr. Taft has very substantial popularity and backing in the sec-

(CONTINUED ON PAGE 131)

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

880 Tons, Pittsburgh, warehouse for Sears, Roebuck & Co., to American Bridge Co., Pittsburgh.

475 Tons, Elizabeth, N. J., warehouse for Sears, Roebuck & Co., to Bethlehem Steel Co., Bethlehem.

400 Tons, Lancaster, Pa., closure warehouse for Armstrong Cork Co., to American Bridge Co., Pittsburgh.

320 Tons, Morton Grove, Ill., factory building, H. M. Harper Co. to Wendnagle & Co., Chicago.

225 Tons, Philadelphia, field house for St. Joseph's College, to American Bridge Co., Pittsburgh.

175 Tons, Perry County, Pa., bridge, Pennsylvania Dept. of Highways, to Bethlehem Steel Co., Bethlehem.

170 Tons, Chicago, warehouse and office building, for H. J. Heinz Co. to Wendnagle & Co., Chicago.

140 Tons, Hatboro, Pa., manufacturing building for Penn Rivet & Machine Co., Philadelphia, to Bethlehem Steel Co., Bethlehem.

120 Tons, Decatur, Ala., high school stadium, to Decatur Iron & Steel Co., Decatur.

110 Tons Jenkintown, Pa., building No. 50 for Standard Pressed Steel Co., to Bethlehem Steel Co., Bethlehem.

• • • **Fabricated steel inquiries** this week included the following:

2600 Tons, Pennsylvania, Pennsylvania Dept. of Properties and Supplies, Jan. 29.

2300 Tons, Huntingdon County, Pa., bridges, route 55, Pennsylvania Dept. of Highways, Jan. 30.

780 Tons, Indianapolis, Michigan St. bridge, U. S. Engineers Louisville office. All bids rejected.

600 Tons, Philadelphia, store building through Turner Construction Co., Philadelphia, Jan. 17.

450 Tons, Camden, N. J., bridges, New Jersey Dept. of Highways, F. A. Canuso Co., low bidder.

400 Tons, Philadelphia, S.W. and N.E. airports, City of Philadelphia, hangars, bids in.

400 Tons, State of Washington, penstocks, U. S. Bureau of Engineers.

350 Tons, Washington, Pan American Union building, through Turner Construction Co., Philadelphia, Jan. 17.

230 Tons, Wilmington, Del., veterans' administration hospital, Jan. 30.

210 Tons, Philadelphia, substructure for Penrose Ave. bridge, through Foley Bros., New York, to American Bridge Co., Pittsburgh.

135 Tons, Lackawanna County, Pa., bridge, Pennsylvania Dept. of Highways, Jan. 23.

110 Tons, Burr Oak, Ind., bridge 299 through State Highway Dept.

110 Tons, Vincennes, Ind., Bridge 2930, State Highway Dept.

• • • **Reinforcing bar awards** this week included the following:

650 Tons, Bellevue, Ohio, elevator for spencer Kellogg Co., through James Stewart Corp., to Bethlehem Steel Co., Bethlehem.

145 Tons, South Bend, Ind., hospital through Gus J. Newburg Construction Co., Chicago to Ceco Steel Products Corp., Chicago.

135 Tons, Martinez, Calif., water filter plant, to Judson Pacific-Murphy Corp., San Francisco.

100 Tons, Riverside County, Calif., highway construction between Whitewater Point and Palm Springs, to Ceco Steel Co.

• • • **Reinforcing bar inquiries** this week included the following:

3000 Tons, Harlan County, Neb., dam to be bid Jan. 29.

1590 Tons, Cambridge, Neb., Madison Greek dam, C. F. Lytle Co., Sioux City, low bidder.

350 Tons, Odair, Wash., miscellaneous finish for Grand Coulee Right Powerplant, Bureau of Reclamation, Denver, Spec. 2075, bids to Feb. 17.

175 Tons, Solano County, Calif., highway construction and separation structure between Vallejo Wye and Route 208, California Div. of Highways, Sacramento, bids to Feb. 4.

100 Tons, Graham County, Ariz., highway construction, Geronimo - Solomonsville highway, Arizona State Highway Commission, Phoenix, bids to Jan. 23.

Coming Events

Jan. 12-16 **Society of Automotive Engineers,** annual meeting, Detroit.

Jan. 12-16 **National Materials Handling Exposition,** Cleveland.

Jan. 18-20 **Stoker Institute of Canada,** annual meeting, Mount Royal Hotel, Montreal, Canada.

Jan. 19-20 **Institute of Scrap Iron & Steel, Inc.,** annual convention, Chicago.

Jan. 21-23 **Society of Plastics Engineers, Inc.,** annual conference, Detroit.

Jan. 21-24 **American Society of Civil Engineers,** annual meeting, New York.

Jan. 29-30 **Wirebound Box Manufacturers Assn.,** annual meeting, Hollywood, Calif.

Feb. 10-11 **Pressed Metal Institute,** annual meeting, Buffalo.

Feb. 15-19 **American Institute of Mining and Metallurgical Engineers,** annual meeting, New York.

Mar. 3-5 **Society of Automotive Engineers,** national passenger car meeting, Detroit.

Mar. 15-19 **ASTE Industrial Exposition,** Cleveland.

Mar. 18-19 **Magnesium Assn., annual meeting, New York.**

Apr. 5-8 **Southern Machinery and Metals Exposition,** Atlanta.

Apr. 5-8 **National Assn. of Corrosion Engineers,** annual conference and exhibition, St. Louis.

Apr. 12-14 **Openhearth Steel Committee and Coke Oven, Blast Furnace and Raw Materials Committee, AIME,** annual conference, Pittsburgh.

Follansbee Stock Deal Will Put New Group In Control of Company

New York

• • • **Following several** weeks of Wall Street rumors on the subject, it was announced here this week that a controlling stock interest in Follansbee Steel Corp. was about to be acquired by the Allan Haye Foundation, of New York. According to a statement by M. A. Follansbee, vice-president of sales, the company had no knowledge of the transaction at midweek, other than that the stock exchange had informed him that the group claimed to have acquired the controlling interest.

The announcement started a wave of conjecture as to the identity of the purchaser. Large steel consumers known to be shopping for a little steel mill of their own were oft-mentioned. Packard Motor Co. was kept busy on Monday denying any part of the transaction.

First details of the move indicated that the new group had under option 183,000 shares of the outstanding common stock to be bought Jan. 20-23 at $50 per share —a $9,150,000 transaction.

Follansbee Steel owns plants in Follansbee, W. Va., and in Toronto, Ohio, with a rated ingot capacity of 126,000 net tons annually. Finishing capacity includes 35,000 tons of hot rolled sheet, 12,000 tons of long terne capacity, and 254,800 tons of cold rolled strip capacity.

Net Earnings Increase Dollar Volume Record

Cleveland

• • • **Estimated earnings** of Arthur G. McKee & Co. for 1947, after allowances for federal taxes, will approximate $670,000, which compares with net profit of $403,828 in 1946.

Dollar volume of new contract work for 1947, measured by the estimated completion cost of plants to be designed and built is larger than for 1946.

Operate First Plant Featuring Completely Controlled Conditions

Fitchburg, Mass.

• • • **The world's first** windowless, controlled conditions plant is claimed by the Simonds Saw and Steel Co., Fitchburg, Mass. Although the 5¾ acre building was completed in 1939, the modernization program has continued up to the present time. The activities formerly housed in three plants with a total of 17¼ acres of floor area are now carried on in the single large room by means of 11 straight line assembly units.

One of the outstanding features of the plant is the lighting, which consists of over 1500 100-watt fixtures with 85-watt fluorescent tubes. These provide a lighting intensity of from 20 to 25-foot candles at the working level of 36 in. from the floor throughout the entire 200,000 sq ft of area. Regardless of season, the weather conditions, or the hour of day or night, the amount of light in each location is always the same. Additional lights are provided at operations requiring greater intensity.

The temperature and relative humidity are controlled by four air conditioning units which provide 400,000 cu ft of air per min or five complete changes of air per hr. Seven artesian wells furnish 1600 gals of 52°F. water per min to the spray nozzles in these units. The air is cooled and washed when passing through this spray.

Twelve complete changes of air per hr in the heat treating section where approximately 100 furnaces are located is made possible by a circulating system of air from out-of-doors at the rate of 200,000 cu ft per min, and the same amount of warm air removed. The result is a circulating system within an air-conditioning system, without any partitions other than curtains in the trusses around the furnace area.

Every effort has been made to reduce the vibration from hammers, grinders, compressors and other pieces of heavy equipment, which are isolated from the plant floor by specially designed foundations. The foundations are then surrounded with shock-absorbing insulation. This allows delicate, precision testing equipment to be used in other parts of the plant without being affected.

In order to reduce the amount of noise interference, an acoustic ceiling, similar to those used in broadcasting studios, has been installed. This ceiling absorbs 93 pct of the sound coming into contact with it.

Many of the operations used in the manufacture of cutting tools are noisy by nature, such as forging, punching and grinding. Some of the forging hammers when operating before moving them into this plant had a sound intensity of 115 decibels. The sound intensity close to these same hammers at present is 92 decibels, yet 70 ft away the sound of the hammers is not noticeable.

All machines in the plant are painted with an orange-yellow lacquer; all furnaces are painted aluminum; benches, tool fixtures and stock racks are painted olive green. The walls, ceiling and trusses are painted white. Supporting columns for trusses are painted black 8 ft above the floor; the upper part is white. All doors are painted black. A black band nine in. high is painted on all walls next to the floor. This color arrangement gives operators a pleasing color contrast with a large amount of reflected light. It also reduces maintenance costs as machines are kept cleaner.

17,000 lineal ft of underfloor power ducts, 38,000 ft of piping,

50 YEARS AGO

THE IRON AGE, *January 13, 1898*

• "The year of 1897 proved a famous one in the annals of iron miners of the great Bessemer region of America, the Lake Superior district. Beginning in a period of depression with three million tons of unsold ore piled on the docks, the year's end saw an increase of 33 pct with furnaces consuming about 20,000 tons of ore per week more than ever before in the history of the trade."

• **"Very interesting experiments have been carried forward in Europe and this country which look to the substitution of carbide of silicon for ferrosilicon in steel manufacture. Soon after Carborundum, or carbide of silicon, appeared on the market as a new abrasive material, the suggestion to put it to use in steel manufacture was made."**

• "The will of Alfred Nobel, Swedish chemist and inventor of high explosives, has been proved. Half the estate is to be invested and the interest divided annually into five prizes. Three prizes will be awarded to persons making the most important discoveries in physics, chemistry, physiology or medicine. One will be given to the person making the best literary contribution and one to the individual who has done most to promote peace throughout the world."

• **"With the single column boring and turning mill built by the Bickford Drill & Tool Co., Cincinnati, work is claimed to be chucked on the table easier than in a lathe. The center of the tool spindle can be brought to the center hole in the table and then with boring bars, difficult shapes can be bored as efficiently as on a special boring machine."**

• "No one conversant with the history of the American iron trade and with its present development will deny that the center of cheapest production has been moving westward. However, it does not follow that the East, which once reigned supreme, will be shorn of all power and will not continue to contribute an important part of the product of the country."

60,500 ft. of galvanized iron conduit and more than 30 miles of wire and cable have been installed in the building, where push-button controls are practically universal. These lines carry power, light, water, gas, steam and air direct to machine and furnace locations by passing above trusses, down columns and under the floor, leaving the working area clear. Central control of process piping is provided in the individual bays.

The entire floor area of the plant, other than foundations, has power ducts cast in the concrete floor. These run the long way of the plant and are spaced 10 ft apart. Every 2 ft along the length of these ducts provision has been made for taking electric power out of the duct. This makes it possible to rearrange or install new equipment in much the same manner as a floor lamp can be moved about in one's home.

British White Paper Asks Capital Spending Cut Of $720 Million

London

• • • **The British government** has issued details of its proposals to cut capital expenditure next year. It had been originally intended to spend $6400 million in 1948. This figure is to be cut by $720 million.

The details are given in a White Paper presented to Parliament by Sir Stafford Cripps, chancellor of the exchequer. There is reference in the White Paper to steel but no definite cut is provided. It is evident that Sir Stafford finds himself unable at the moment to decide between the two courses of allowing money and materials to be used in setting up plants to produce more steel or to use the steel immediately available in other industries which will give quicker returns in dollar-saving and dollar-producing.

The White Paper says that production of ingot steel is not likely to exceed 14 million tons in 1948. This is practically the total capacity of the industry and there is no immediate likelihood of any increase until new steel plants can be brought into operation.

It is improbable that imports of steel will add very substantially to the supplies available. Steel is, however, one of the most important ingredients in British exports, which are heavily weighted on the side of engineering products, and prospective supplies are inadequate to meet the export task, the requirements of increasing investment programs and the essential production of steel goods for home market.

The steel requirements of the export programs are not yet precisely calculable and it is possible that when the necessary trade agreements with other countries for the supply of essential foodstuffs and raw materials have been made, even greater demands may arise for steel for export than are now contemplated. Furthermore, limitations in the supply of particular classes of steel within the general total may limit certain categories of home investment which require special types of finished steel. Taking all these circumstances into consideration, the White Paper recognizes that the iron and steel industry's program for new equipment and major replacement work so as to raise output to 15 million ingot tons a year is vital to Britain's recovery.

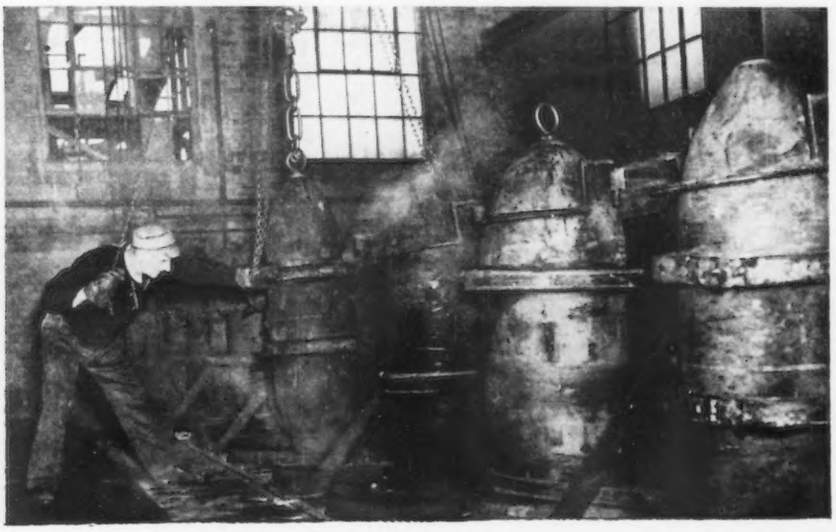
As with coal the general conclusion must be that the maximum increase in the shortest possible time is required. The program which was drawn up in 1945 is now being reviewed with a particular eye to its size and practicability. Final decisions will be taken when the detailed proposals are available. What cuts, therefore, if any, in the steel industry's $800 million reconstruction scheme are to be made is not yet known. As a matter of fact definite schemes of development absorbing half that figure have already been approved by the Iron & Steel Board and some are under way.

As regards other industries, the government White Paper is definite that cuts must be made and some of them are very severe. The program for the provision of houses is to be cut, and all factory building including extensions now in progress which have not reached the steel erection stage will be reviewed with the object of postponing at least half.

New construction for schools, fire stations, prisons and police stations will not be undertaken. Building work for post offices will be postponed, the possibility of connecting up new subscribers will be materially restricted and the present waiting list of 400,000 will steadily grow.

The program of major road works will be reduced by more than 80 pct. The Severn Bridge and Dartford Tunnel, the Great West Road extensions, the Widnes-Runcorn Bridge and the main Jarrow Tunnel are among works which will be postponed. Work on the railways which is well advanced will

BOILING BOMBS: *Thousands of tons of steel, copper and brass metals urgently needed to help Britain's production drive are being recovered by the breakdown of bombs, shells and ammunition left from the war. High powered steam jets are forced into these* 1000 *lb bombs, literally boiling out the high explosives. The empty cases are then removed to mills as salvage.*



not be postponed but other work will be partly deferred and some may be postponed altogether.

Work on employment exchanges will cease. Even the program for the provision of new electric generating plants is affected. The government states that it is prepared to accept the risk of load-shedding which may arise. The ship building industry's program of work is to be reduced, and the provision of new motor cars for business use in 1948 is to be reduced to 50,000.

Government Reports On Methods of Manganese Production Are Issued

Washington

• • • **Five reports,** covering wartime investigations by the Bureau of Mines into ways of producing commercial grade manganese from native manganese ores in Arizona, Utah and Oregon, have now been made available for distribution.

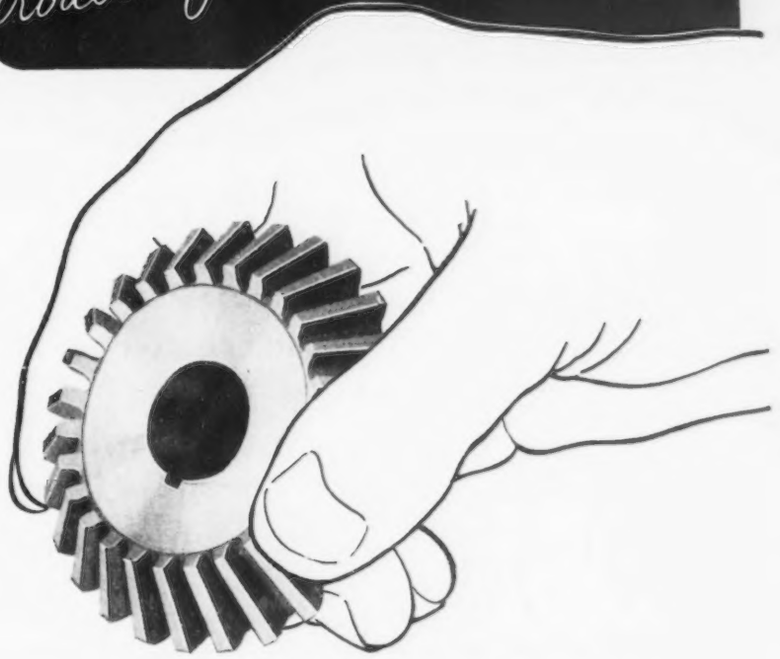
Gist of these reports is that commercially acceptable manganese concentrates from Ophir, Utah, were achieved by simple washing and gravity methods and that Long Valley, Ariz., ores could be beneficiated to a grade containing 48 pct or better manganese.

On the other hand, it was found that marketable concentrates could not be produced from either Durkee District, Ore., or Artillery Peak, Ariz., deposits by the ordinary ore-dressing methods. None of the samples from southeastern Juab County, Utah, were amenable to production of high grade sinter.

Free copies of the reports may be obtained on request from the Bureau of Mines, 4800 Forbes St., Pittsburgh, 13. Requests should be by titles which are:

Investigation Report 4140, "Concentration of Oxide Manganese Ores from Vicinity of Long Valley, Coconino Co., Ariz."; Investigation Report 4148, "Concentration of Oxide Manganese Ores from Artillery Peak Deposit, Mohave Co., Ariz."; Investigation Report 4141, "Concentration of Manganese Ore from Southeastern Juab Co., Utah"; Investigation Report 4130, "Concentration of Oxide Manganese Ore from Ophir Hill Mine, Ophir, Utah"; and, Investigation Report 4149, "Concentration of Oxide Manganese Ore from Sheep Mountain Property, Durkee Dist., Ore."

PERKINS' contribution to industry
trouble-free power transmission



Whatever your gear requirements may be, we have the experience, equipment and facilities to fulfill them to your complete satisfaction.

Since the proof of the pudding is in the eating it may be pointed out that the manufacturers of the type of consumer goods which have a world-wide reputation for quality use PERKINS Custom-Cut GEARS as a matter of course.

You Furnish the Specifications • We'll Produce the Gears

• **PERKINS MAKES — In All Materials, Metallic & Non-Metallic** Helical Gears, Bevel Gears, Ratchets, Worm Gears, Spiral Gears, Spur Gears, Ground Thread Worms

PERKINS MACHINE & GEAR Company
Springfield 2, Massachusetts

Our extensive facilities and modern machine tools are also adaptable to the manufacture of all kinds of various parts other than gears, such as the following:

SPROCKETS SPLINED SHAFTS SCREW MACHINE PARTS
up to 2¼" in diameter

We are also exceptionally well equipped to build, to your specifications, such mechanical units as—

PUMPS • SPEED REDUCERS & COMPLETE MACHINES

either in experimental or production quantities. Our well-known reputation is your guarantee of satisfaction. Let us quote on your requirements.

Tennessee Products & Chemical Corporation

Announces—

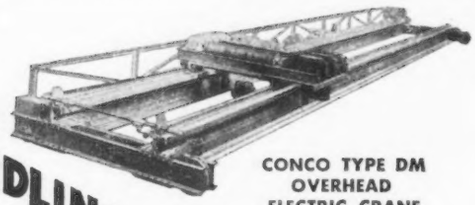
Effective January 1, 1948, it will operate the plant of Southern Ferro Alloys Company in Chattanooga (which it acquired in May, 1947) as its Southern Ferro Alloys Division.

Mr. John Kruesi will continue as Manager and there will be no change in the personnel.

The policy of the management will likewise continue, and no effort will be spared to maintain the highest standards of quality and service.

Nashville, Tenn.,
December 30, 1947.

CONCO HANDLING EQUIPMENT



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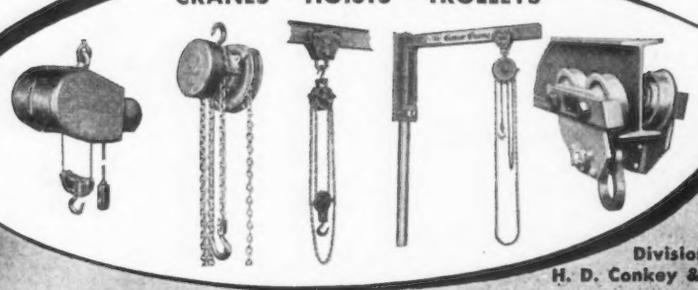
● WRITE today for complete information on the CONCO line of hand-powered and electric cranes, hoists and trolleys — a complete line, tried and proven for over twenty years. CONCO engineers are qualified to recommend the right type of handling equipment for faster, more economical production in your shop. Write us now, and take advantage of our long experience in moving more materials, faster and at less cost.

CRANES • HOISTS • TROLLEYS



Division of H. D. Conkey & Co.

CONCO ENGINEERING WORKS, 15 Grove St., MENDOTA, ILL.

Officers Chosen By Cutting Tool Assn. At Detroit Meeting

Detroit

• • • **D. E. Van Deusen,** president and general manager of Kelly Reamer Co., Cleveland, was elected president of the Cutting Tool Manufacturers' Assn. at the fourth annual membership meeting, held in Detroit. He succeeds E. A. Goddard, president, Goddard and Goddard Co., Detroit.

D. E. Van Deusen

Elected vice-president of the assn. was Emil Gairing, president, Gairing Tool Co., Detroit. R. H. Wolfe, president, Arrow Tool and Reamer Co., was re-elected treasurer, while Harry J. Merrick continues as executive secretary of the C.T.M.A.

Elected to serve the next three years on the board of directors of the assn. were Norman Lawton, works manager, Star Cutter Co.; J. I. Schultz, vice-president, National Broach and Machine Co.; R. G. Michell, president, Eclipse Counterbore Co.; and W. G. Robbins, president, Carboloy Co., Inc., all of Detroit.

E. J. Kaiser, manager of the Davis Boring Tool Div., Giddings and Lewis Machine Tool Co., Fond-du-Lac, Wis., and Gordon Birgbauer, president, Super Tool Co., Detroit, were also elected to the board to fill two vacancies.

WAA Approves Plant Sale

Washington

• • • **Sale of a** Fredericksburg, Mo., milling plant to its war-time operator, St. Louis Smelting and Refining Co., for $210,000, has been approved by WAA. It was built in 1943 by the Defense Plant Corp. for the processing of crude lead ore and nickel-cobalt-copper ore. While the plant is a complete independent operating unit, it depends upon the purchaser for ore supplies. The original cost was $626,600.

Buyer's Guide

(CONTINUED FROM PAGE 88)

Combustion Engineering Co., 200 Madison Ave., New York.

Consolidated Steel Corp., Ltd., S. Eastern Ave., Los Angeles.

Erie City Iron Works, Erie, Pa.

Murray Iron Works Co., Burlington, Ia.

Springfield Boiler Co., Springfield, Ill.

Union Iron Works, Cascade St., Erie, Pa.

Bolt, Nut, Rivet Machinery

Botwinik Bros. of Mass., Inc. (New & Used), 5 Sherman St., Worcester 1, Mass.

Donahue Steel Products Co. Inc., 1919 W. 74th St., Chicago 36.

Galbreath Machinery Co. (Used), Empire Bldg., Pittsburgh.

General Machy. & Equipt. Co., 180 So. 15th St., Harrisburg, Pa.

The Hill Acme Co., 6400 Breakwater Ave., N. W., Cleveland 2.

Machinery Liquidating Co., 2306 W. Warren Ave., Detroit 8.

Miles Machinery Co., 2025 E. Genesee Ave., Saginaw, Mich.

Sheffield Steel Corp., Sheffield Sta., Kansas City 3.

Simmons Machine Tool Corp., Albany 1.

Waterbury Farrel Foundry & Machine Co., 453 Bank St., Waterbury 86, Conn.

West Penn Machinery Co., 1210 House Bldg., Pittsburgh 22.

Bolts, Expansion, Toggle

Ackerman-Johnson Co., 625 W. Jackson Blvd., Chicago 6.

Arro Expansion Bolt Co., 300 Boone Ave., Marion, Ohio.

Chase Brass & Copper Co., Waterbury, Conn.

Chicago Expansion Bolt Co., 1338 W. Concord Place, Chicago 22.

J. T. Ryerson & Son, Inc., Chicago 80.

Bolts, Nuts, Screws

Bethlehem Steel Co., Bethlehem, Pa.

Continental Screw Co., New Bedford, Mass.

Clark Bros. Bolt Co., Milldale, Conn.

Elco Tool & Screw Corp., 1800 Broadway, Rockford, Ill.

The Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13.

Lamson & Sessions Co., 1971 West 85th St., Cleveland 2.

Lewis Bolt & Nut Co., Minneapolis.

The Maryland Bolt & Nut Co., Mt. Washington, Baltimore 9.

Wm. H. Ottemiller Co., Pattison St. & N. & P. R. R., York, Pa.

Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50.

Stronghold Screw Products, Inc., 216-222 W. Hubbard St., Chicago 10.

Wasmer Bolt & Screw Corp., 13000 Athens Ave., Cleveland 7.

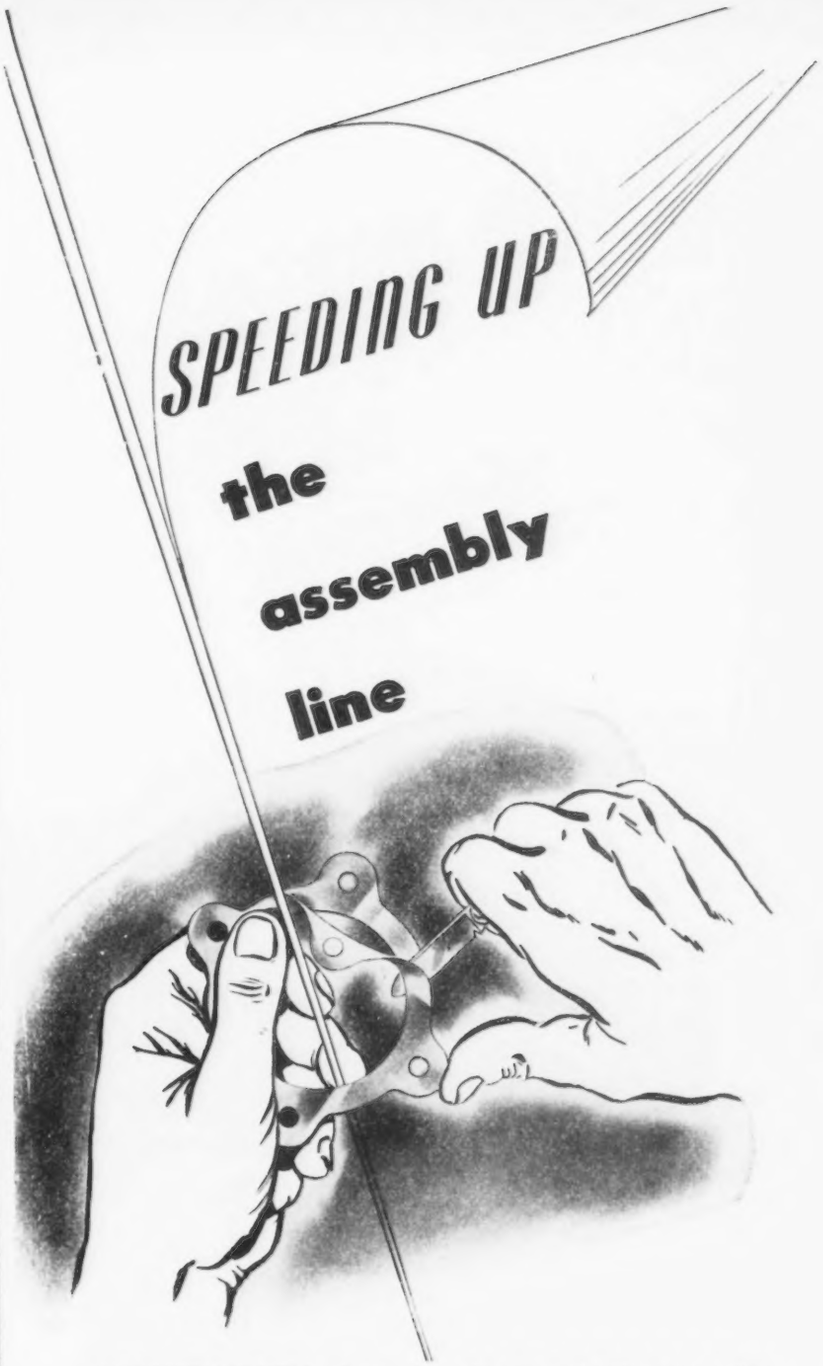
Booth Cleaning (Paint Spray)

The C. O. Bartlett & Snow Co., 6200 Harvard Ave., Cleveland 5.

Detrex Corp., 14331 Woodrow Wilson, Detroit.

Fidelity Chem. Prod. Corp., 430 Riverside Ave., Newark 4, N. J.

Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7.



IN SPEEDING UP the fitting of machine parts by eliminating the precision machining otherwise required, Laminum shims actually add to the certainty of uniform accuracy . . . you simply peel laminations of known precision gauge from the solid shim. Bulletin on request.

Laminum shims are cut to your specifications. For maintenance work, however, shim materials are sold through industrial distributors.

Laminated Shim Company, Incorporated

76 Union Street • Glenbrook, Conn.

LAMINUM

THE SOLID SHIM THAT peels FOR ADJUSTMENT

2217

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4.

Solventol Chemical Products Inc., 15841 Second Boulevard, Detroit 3.

A. J. Stull & Co., 4420 Paul St., Frankford, Philadelphia 24.

Turco Products, Inc., P. O. Box 2649 Terminal Annex, Los Angeles 54.

Booth Coating (Paint Spray)

Detrex Corp., 14331 Woodrow Wilson, Detroit.

Fidelity Chem. Prod. Corp., 430 Riverside Ave., Newark 4, N. J.

Foundry Rubber, Inc., 1050 30th St., N. W., Washington 7.

Frost Paint & Oil Corp., 1209 N. E. Tylor St., Minneapolis 13.

Quaker Chemical Products Corp., Conshohocken, Pa.

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4.

Standard Varnish Works, 2600 Richmond Terr., Port Richmond 3, S. I., N. Y.

Thompson & Co., 1085 Allegheny Ave., Oakmont, Pa.

Turco Products, Inc., P. O. Box 2649 Terminal Annex, Los Angeles 54.

Borax

American Cyanamid Co., Rockefeller Plaza, New York.

Beam-Knodel Co., 195 Lafayette St., New York 12.

E. I. Du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Harshaw Chemical Co., Cleveland.

Pacific Coast Borax Co., 51 Madison Ave., New York.

Boric Acid (Boracic Acid)

Beam-Knodel Co., 195 Lafayette St., New York 12.

E. I. Du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Pacific Coast Borax Co., 51 Madison Ave., New York.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Boring Bars

The C. O. Bartlett & Snow Co., Cleveland 5.

McCrosky Tool Corp., S. Main St., Meadville, Pa.

Boring Heads

Bokum Tool Co., 14775 Wildemere Ave., Detroit 21.

Mummert-Dixon Co., Philadelphia & Gay Sts., Hanover, Pa.

Boring Machines, Horizontal

Barnes, W. F. & John, Co., 301 S. Water St., Rockford, Ill.

Davis & Thompson Co., 4611 W. Burnham St., Milwaukee 14.

The G. A. Gray Co., 3611 Woodburn Ave., Cincinnati 7.

Hill-Clarke Machinery Co., 648 W. Washington Blvd., Chicago 6.

The Lucas Machine Tool Co., 523 E. 99th St. at N. Y. C. R., Cleveland 8.

Ritterbush & Co., Inc., 50 Church St., New York 7.

Universal Boring Machine Co., 312 Main St., Hudson, Mass.

Boring Machines, Vertical

W. F. & John Barnes Co., 301 So. Water St., Rockford, Ill.

The Cincinnati Planer Co., 6120 Forrer St., Oakley, Cincinnati 9.

Davis & Thompson Co., 6411 W. Burnham St., Milwaukee 14.

Hill-Clarke Machinery Co., 648 W. Washington Blvd., Chicago 6.

Boring and Threading Machines, Precision, Internal

Barnes Drill Co., Rockford, Ill.

Bokum Tool Co., 14775 Wildemere Ave., Detroit 21.

Bullard Co., Bridgeport, Conn.

Defiance Machine Works, Defiance, Ohio.

Boron

General Chemical Co., 40 Rector St., New York.

Harshaw Chemical Co., 1900 E. 97th St., Cleveland 6.

Boron Compounds, Steel Alloying

Electro Metallurgical Co., 30 E. 42nd St., New York 17.

General Chemical Co., 40 Rector St., New York.

Harshaw Chemical Co., 1900 E. 97th St., Cleveland 6.

Vanadium Corp. of America, 420 Lexington Ave., Graybar Bldg., New York 17.

Wall-Colmonoy Corp., 714 Fisher Bldg., Detroit 2.

Boxes, Carburizing (See Carburizing Boxes)

Boxes, Coupling

American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill.

Blaw-Knox Co., Pittsburgh.

Continental Foundry & Machine Co., Grant Bldg., Pittsburgh.

Mesta Machine Co., Pittsburgh.

Tool Steel Gear & Pinion Co., Township Ave., Cincinnati.

Boxes, Float

Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32.

Davis Regulator Co., Washtenew Ave., Chicago.

Boxes, Tote

Allied Steel Products Co., 3500 Walnut St., Philadelphia 4.

All-Steelequipment, Inc., Aurora, Ill.

Edwards Mfg. Co., Eggleston Ave., Cincinnati.

New Britain Machine Co., South St., New Britain, Conn.

Reynolds Spring Co., Jackson, Mich.

U. S. Steel Products Co., Boyle Mfg. Div., Santa Fe Ave., Los Angeles.

Brakes, Magnetic

Cutler-Hammer, Inc., St. Paul Ave., Milwaukee.

General Electric Co., Schenectady, N. Y.

Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee 4.

Westinghouse Electric Co., Pittsburgh.

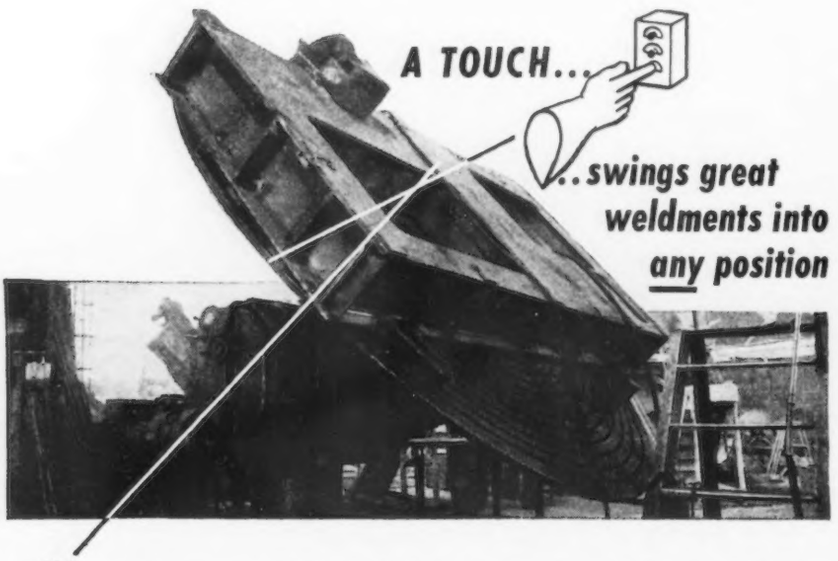
Brakes, Press

E. W. Bliss Co., Amsterdam Ave., Detroit.

Cincinnati Shaper Co., Cincinnati 25.

Dries & Krump Mfg. Co., Loomis Blvd., Chicago.

(To Be Continued)



WHEN welders can swing tons of weldment into any position for the next downhand pass quickly and safely, with a touch on the push button control, they are able to work better, faster and more economically, no matter what the job. Interruptions in any welding operation are costly—when welders or their helpers must prop up, flop, turn over, crawl under, over and around a weldment, they are adding costs to the job. Because more and more welding is being done in today's production, it is important that your welding costs and quality be examined in the light of economies and improvements made possible by C-F Positioners.

Not only do C-F Positioners give welders more time for welding by permitting them to swing weldments into the correct position for a downhand pass, they make all welding better and more economical by making possible the use of heavier electrodes, eliminate "over-welding" and waste of power and materials. Write for Bulletin WP22. CULLEN-FRIESTEDT CO., 1303 S. Kilbourn Ave., Chicago 23, Ill.

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

C-F positioned welds mean better, more economical welds

It Really Pays To Remove Drawing Lubricants the Oakite Way!

When lubricants are not completely removed from drawn or pressed work, increased costs can result from such causes as these:

1. If the lubricant contains water, steel shapes are likely to rust.

2. Rejects may occur in painting and enameling.

3. Lubricant left on drawn work may be burned-in during annealing, forming deposits that are more difficult to remove later.

4. Deposits built up on metal surfaces slow production in seam- and spot-welding machines.

Oakite cleaning compounds prevent these costly troubles. That is why they are widely preferred for removing drawing lubricants. They clean thoroughly, safely, quickly.

Let your Oakite Technical Service Representative study your lubricant-removal problems.

Arrange NOW for his free, money-saving service. No obligation.

OAKITE PRODUCTS, INC.
30H Thames Street, NEW YORK 6, N. Y.
Technical Service Representatives Located in Principal Cities of United States and Canada

OAKITE

Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

Gallup Poll

(CONTINUED FROM PAGE 123)

tion of the country from which he hails, and his next best section is the New England and Middle Atlantic area. When the poll results are analyzed by geographical sections, they show the following:

	Truman Pct	Taft Pct	No opin. Pct
N. Eng. & M. Atl.	52	35	13
E. Cent.	50	40	10
W. Cent.	55	34	11
South	74	16	10
Far West	60	28	12

The Taft forces can also count on more support from citizens who have had college training than from other education levels. The poll results according to degree of education of the voter are as follows:

	Truman Pct	Taft Pct	No opin. Pct
College	55	36	9
High School	57	32	11
Grade or No school	57	28	15

Among the major occupation groups, Mr. Taft's candidacy faces substantial opposition among manual workers, and to a lesser extent among white collar workers and farmers.

The vote:

	Truman Pct	Taft Pct	No opin. Pct
Bus. & Prof.	48	42	10
White collar	58	32	10
Farmers	58	31	11
Manual workers	60	27	13
Labor union members	65	22	13

Lukens Steel Dividends

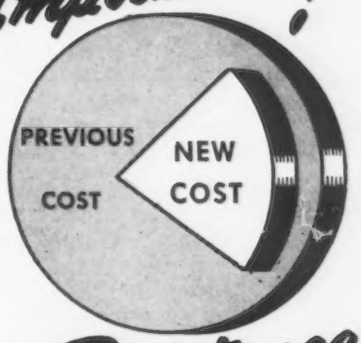
Coatesville, Pa.

• • • **At a meeting** of the board of directors of Lukens Steel Co. here a year-end dividend of 50¢ per share was declared on the common stock of the company. A regular dividend of 10¢ per share was voted also, to be paid out of the earnings of the company upon its outstanding stock.

The 60¢ total dividend is payable Feb. 14, 1948, to stockholders registered on the books of the company at the close of business Jan. 30, 1948.

Lukens Steel's regular dividends are 10¢ a quarter, but during the calendar year of 1947 it paid also an extra dividend of 60¢.

Impossible?



Resistance Welding did it!

At Heywood-Wakefield, for instance, re-designing of the coach seat pedestal for assembly by resistance welding had the following results:

1. **The Progressive Seam Welder paid for itself in the first few weeks of operation.**
2. **Since then it has been saving enough to pay the wages of 10 other H-W workers on other jobs.**
3. **A higher quality seat pedestal was produced.**

You'll find the story of how this was done along with "How 33 operations were cut to 5"; "Simple machine makes petcock wrenches faster"; "How to resistance weld without heavy duty power lines"; and "How to design for projection welding", in

RESISTANCE WELDING PICTORIAL - 50
Ask for it, today.

IT PAYS TO WELD

PROGRESSIVE WELDER COMPANY
3050 E. OUTER DRIVE, DETROIT 12, U.S.A.

MACHINE TOOLS

. . . News and Market Activities

Some Builders Expected to Raise Prices as Outlook is Bullish

• • • **Reliable sources** in the trade report that many machine tool builders, specifically those who have not already done so, will raise prices within the next 30 to 60 days, including some of the principal producers of turret lathes.

Preliminary reports on December business industry-wise indicate that shipment will total about $27 million, making 1947 a $300 million year in no uncertain terms. New firm orders, it is expected, will be up about $3 million or 16 pct over November, and cancellations will be high, about double the November total. Unfilled orders will probably still reflect the downward trend, primarily because December shipments were much higher than November shipments, and new firm orders only slightly higher than the November level.

Trade sources consider December 1947 typically a year-end month, since if November is seasonally down, and if December is a good month, past performance indicates that January usually follows suit.

Many segments of the machine tool industry found the going good during all or most of the last quarter, with December a standout. One producer sold more machines in the final month than in any month of 1947 except June.

The bullish outlook has it that 1948 will be as good as 1947, but pessimistic prognosticators are studiously withholding judgment. The December showing, they point out, may have stemmed solely from reinstatement of escalator clauses and price increases, which always squeeze in some business.

Dealers not usually given to whistling in the dark report that business is pretty fair, although the automobile industry, with the exception of Kaiser-Frazer, does not seem to be entertaining any serious retooling program at the moment. With no major changes scheduled for this year, the hope lies in changes at the end of the year for 1949 models, which will involve new tooling.

Suppliers of Auto Industry Report Slump; Overall Trend Irregular

° ° °

Some producers of electrical components have reinstated the clause reading, "price prevailing at the time of delivery," despite price cuts on household lines. This is the same clause that was removed last September. While the customers are getting more or less used to this sort of thing, they still don't like it.

While most of the remaining surplus machine tools in War Assets Administration warehouses are tied up under the JANMAT program, a few machines are being made available, some under veterans' priorities. At the same time, certain operators are sending out letters to the trade indicating that machines can be "sprung" from JANMAT, for a price.

Formal announcement of sales training course set up with Cornell University under auspices of the sales service committee of National Machine Tool Builders' Assn. will soon be forthcoming. According to reports, the course will be held on the campus at Ithaca, this summer, for about 50 machine tool company executives, sales managers and salesmen.

In Detroit, a survey of various segments of the machine tool industry indicates that the business trend is at present irregular. Suppliers whose volume follows new car production indicate that sales have recently fallen off appreciably, probably reflecting the holiday dip in auto output. There are also indications that possible plant shutdowns for new model changes in 1948 may be a factor in expendable tool buying.

Buying of new welding equipment is said to be brisk as new models move closer to actual production. Suppliers of progressive type machines have reported that interest is still high in such equipment, but that the volume of actual buying is somewhat lower. In most cases this is explained as a simple holdup in the release.

One of the more recent quotations requested is for extensive tooling by Kaiser-Frazer at Willow Run, where it has been announced that the company plans to spend $2 million for new equipment and tools. An additional $5 million is to be spent for the K-F Detroit engine plant. Informed sources here believe that eventually much of the K-F engine activity will center at Willow Run.

In the East, dealers report their sales volume in December the highest of any month in 1947. A great many inquiries that had been pending for months were turned into orders in that month. A large proportion of the business was for specialized tools and came from the larger metalworking organizations.

It is believed that the flood of December orders was caused by the effort to make needed capital expenditures before the year end, coupld with the conviction on the part of management that prices were bound to go up during 1948. However, most of this business was covered by escalator clauses. Delivery time on standard tools is reported to be from 4 to 6 weeks, less if necessary.

•

Returned to Armed Forces

Cleveland

• • • **More than** $25.5 million worth of machine tools and industrial equipment, previously declared surplus, were returned to the armed services during 1947 by War Assets Administration warehouses in northern Ohio and western Penna. The surplus items were shipped on instructions by the Joint Army-Navy Machine Tool Committee.

The armed services have taken about 80 per cent of the machine tools and 40 per cent of the industrial equipment described on Cleveland region lists which already have been screened.

CUMBERLAND GROUND SHAFTS

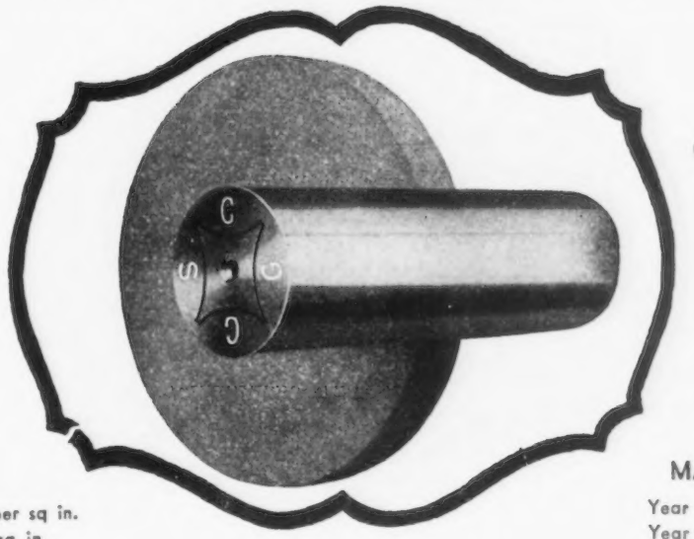
An Exclusive Product made by an Exclusive Method

DIAMETERS 1⅛" to 8" INCLUSIVE

•

MINIMUM ELASTIC LIMIT

Cumberland Brand—30,000 lb per sq in.
Potomac Brand—45,000 lb per sq in.
Cumsco Brand—55,000 lb per sq in.



CONCENTRIC STRAIGHT ACCURATE

•

MAXIMUM LENGTHS MANUFACTURED

Year 1845—up to 16 feet
Year 1886—up to 25 feet
Year 1945—up to 70 feet

They are carefully ground to our standard manufacturing tolerance, plus nothing to minus .002" on diameters 1-1/8" to 2-7/16" inclusive . . . plus nothing to minus .003" on diameters 2-1/2" to 8" inclusive. Closer tolerance can be furnished, if desired.

•

IMMEDIATE SHAFTS

Distributed by

Baltimore, Maryland—Addison Clarke & Bro.
Boston, Mass.—Hawkridge Brothers Company
Boston, Mass.—Brown-Wales Company
Bridgeport, Conn.—Hunter & Havens, Inc.
Buffalo, New York—Jos. T. Ryerson & Son, Inc.
Chicago, Ill.—Central Steel & Wire Co.
Cincinnati, Ohio—Jos. T. Ryerson & Son, Inc.
Cleveland, Ohio—The Bissett Steel Company
Dayton, Ohio—Central Steel & Wire Co.
Detroit, Michigan—Central Steel & Wire Co.
Fort Worth, Texas—C. A. Fischer
Hartford, Conn.—Hunter & Havens, Inc.
Indianapolis, Ind.—Tanner & Company
Jersey City, N. J.—Jos. T. Ryerson & Son, Inc.
Kansas City, Mo.—F. H. Turner
Lakeland, Fla.—Mine & Mill Supply Co.
Los Angeles, Calif.—Link-Belt Co., Pacific Div.
Louisville, Ky.—Neill-LaVielle Supply Co.
Martinsburg, W. Va.—W. H. Heiston & Son
Montreal, Can.—Drummond, McCall & Co., Ltd.
New York City, N. Y.—Bright Steel Corp.
Oakland, Calif.—Link-Belt Co., Pacific Div.
Philadelphia, Pa.—Charles Bond Company
Philadelphia, Pa.—Horace T. Potts Co.
Pittsburgh, Pa.—McKee-Oliver, Inc.
Portland, Maine—W. L. Blake & Company
Portland, Oregon—Link-Belt Co., Pacific Div.
Providence, R. I.—Congdon & Carpenter Co.
Quebec, Canada—H. Duchene
San Francisco, Calif.—Link-Belt Co., Pacific Div.
Seattle, Wash.—Link-Belt Co., Pacific Div.
Spokane, Wash.—Link-Belt Co., Pacific Div.
Toronto, Canada—Drummond, McCall & Co., Ltd.
Worcester, Mass.—Pratt & Inman

CUMBERLAND STEEL COMPANY

CUMBERLAND, MARYLAND, U. S. A.
ESTABLISHED 1845 INCORPORATED 1892

NONFERROUS METALS

. . . News and Market Activities

Copper

• • • **Domestic and foreign** demand for copper are reported to be growing stronger as producers opened their February order books. Wire mill demand continues very heavy and brass mill requirements are reported to be improving. Copper producers have decided to absorb the increased freight rates to the Valley, leaving the present refinery differential unchanged. Major producers are holding their export price at 21.50¢ f.a.s. New York, but small tonnages are being sold at the equivalent of 21.75¢. Were the tonnage sold at this higher export price to grow, it would be sure to have an inflationary effect on the domestic market price as the result of pressure by the Chilean Government to sell at the highest price.

During the week, refineries and ingot makers increased their scrap buying prices, but they were disappointed in finding that the volume of scrap did not increase commensurately with the new prices. Delivered prices were increased by refineries to 19¢ for No. 1 copper, 18¢ for No. 2, and 17¢ for light copper. Refinery brass was increased 15.75¢ per unit copper content and the $5 smelting charge has been eliminated. Ingot producers raised their buying prices to within ¼¢ per lb of those of the refineries and subsequently increased ingot prices.

•

Zinc

• • • **The trade is** watching Joplin ore prices, expecting to see an immediate increase which would prompt producers to increase slab zinc prices at once. Early this week the Joplin market remained unchanged and current zinc prices were not increased. Demand for all grades of zinc remain strong and most grades are in short supply.

Unfilled orders for slab zinc at the end of December rose to 59,705 tons, an increase of 16,455 tons since November, according to figures released by the American Zinc Institute. Stocks at the end of the month were 68,011 tons, 1155 tons lower than the previous month. Production increased to 70,996 tons during December, 1314 tons greater than last month. Domestic shipments reached 61,258 tons, the best month since April. Export and drawback shipments were 7970 tons. Shipments for government account were only 2923 tons, making a total of 40,230 tons for the government during the year.

Total production during 1947 was 848,027 tons, the highest since 1944. Domestic shipments during the year were 698,281 tons, lower than any year since 1940. Including export, drawback and stockpile, however, shipments totaled 955,816, higher than any wartime ore prewar year at least as far back as 1929.

•

Raise Brass Ingot Prices

New York

• • • **A major producer** of brass and bronze ingots announced price increases last week ranging from ½¢ per lb on gunmetal (88-10-2) and manganese bronze ingots to 1½¢ on red brass (85-5-5-5), yellow brass and bearing bronze (80-10-10) ingots. An increase of 1¢ per lb applies to nickel alloy, aluminum bronze and silicon bronze ingots.

These higher ingot prices, the fourth rise since Nov. 24, have been required by higher copper and brass scrap prices during the last few weeks caused by greater confidence in the stability of the 21.50¢ virgin copper price, coupled with a renewal of buying of copper and copper alloy scrap by refineries. According to ingot producers, the current level of ingot prices after the last rise is still below the price level of castings produced from virgin copper.

•

Lead

• • • **Pressure from** consumers for deliveries of lead is increasingly heavy. Producers are selling from day to day as metal becomes available. The tonnages which consumers are attempting to place indicates that an effort is being made to build up inventories, but available metal presages disappointment for buyers. However, producers are under the impression that most consumers are ordering more than warranted by their requirements in order to set up a cushion which will be cut by producers.

Imports of lead for the first 11 months of 1947 reached 138,580 tons, as compared with 101,929 tons in 11 months of 1946. Imported tonnage in 1947 included 74,056 tons from Mexico, 52,771 tons from Canada and 8958 tons from Australia. Total imports by the United Kingdom during the 11 months of 1947 were 177,142 tons.

•

Aluminum Plant Sale To Columbia Steel Co. Is Announced by WAA

San Francisco

• • • **Sale of the** surplus aluminum reduction plant at Torrance, Calif., to the Columbia Steel Corp., San Francisco, for $4.2 million has been announced by WAA.

Should the sale be approved by the Dept. of Justice, Columbia plans to remove some of the present buildings and erect a cold rolling mill on the property.

Original cost to the government was about $12.9 million and the present appraised value has been placed at about $5 million. Columbia will pay the government $500,000 down and the remainder when the transaction is completed.

Nonferrous Metals Prices

Cents per pound

	Jan. 7	Jan. 8	Jan. 9	Jan. 10	Jan. 12	Jan. 13
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	94.00	94.00	94.00	94.00	94.00	94.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point, freight allowed	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$40.00
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$80 to $90
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$80 to $82
Nickel, electro, f.o.b. New York	36.56¢
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$66 to $69
Silver, New York, cents per oz.	74.625
Tin, Grade A, New York	94.00
Zinc, East St. Louis	10.50
Zinc, New York	11.10
Zirconium copper, 6 pct Zr. per lb contained Zr.	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	20.00-20.50
No. 120	19.50-20.00
No. 123	19.00-19.50
80-10-10 ingot	
No. 305	25.00-25.50
No. 315	22.50-23.00
88-10-2 ingot	
No. 210	30.50-31.00
No. 215	28.50-29.00
No. 245	23.25-23.75
Yellow ingot	
No. 405	16.50-17.00
Manganese Bronze	
No. 421	18.50-19.00

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 capper, max.	16.00-16.75
0.60 copper, max.	15.50-16.25
Piston alloys (No. 122 type)	15.50-16.00
No. 12 alum. (No. 2 grade)	15.25-15.75
108 alloy	15.50-16.00
195 alloy	15.50-16.50
AXS-679	15.75-16.25
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-95½ pct	15.25-16.00
Grade 2—92 pct-95 pct	14.00-15.00
Grade 3—90 pct-92 pct	13.50-14.50
Grade 4—85 pct-90 pct	13.25-14.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37⅝
Electrodeposited	32.34
Rolled, oval, straight, delivered	32.59
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33⅜
Zinc, cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz. lots, per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	44.50
Copper sulfate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	54.00
Sodium cyanide, 96 pct, domestic, 200 lb drums	16.00
Zinc cyanide, 100 lb drums	35.50
Zinc sulfate, 89 pct, granules, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall; 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 52S, 24.2¢ 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75-S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness; 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam. rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢ 10,000 lb base. B & S gage 00-1; 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢. B & S gage 8 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢ 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.21; 5/16 to ⅜, $1.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	81

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

Cents per pound, freight prepaid on 200 lb.

	Extruded Shapes	Rods	Sheets
Copper	33.53	....	33.68
Copper, hot-rolled	....	30.03	...
Copper, drawn	....	31.03	..
Low brass	34.04*	31.07	31.38
Yellow brass	32.39*	29.32	29.63
Red brass	34.65*	31.68	31.99
Naval brass	29.56	28.31	34.25
Leaded brass	27.98	24.39	30.13
Commercial bronze	35.52*	32.80	33.11
Manganese bronze	33.14	31.64	37.75
Phosphor bronze, 5 pct.	53.25*	52.25	52.60
Muntz metal	29.17	27.92	32.36
Everdur, Herculoy, Olympic, etc.	37.07	35.57	38.44
Nickel silver, 5 pct.	41.20	40.28	38.67
Architectural bronze	27.94	....	....

*Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Yellow brass rod turnings	14¼¢
Leaded yellow brass turnings	14¼¢
Loose yellow brass trimmings	15¼¢

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Copper and Brass

No. 1 heavy copper and wire	16½—17
No. 2 heavy copper and wire	15½—16
Light copper	14 —14½
Auto radiators (unsweated)	9¼— 9¾
No. 1 composition	12 —12½
No. 1 composition turnings	11½—12
Clean red car boxes	10 —10½
Cocks and faucets	9¾—10¼
Mixed heavy yellow brass	7½— 8
Old rolled brass	8 — 8½
Brass pipe	8¾— 9¼
New soft brass clippings	11½—12
Brass rod ends	9 — 9½
No. 1 brass rod turnings	9 — 9½

Aluminum

Alum. pistons with struts	4½— 5
Aluminum crankcases	6 — 6½
2S aluminum clippings	9 — 9½
Old sheet & Utensils	6 — 6½
Mixed borings and turnings	— 2
Misc. cast aluminum	5½— 6
Dural clips (24S)	5 — 5½

Zinc

New zinc clippings	6 — 6½
Old zinc	4½— 5
Zinc routings	2½— 3
Old die cast scrap	2½— 3

Nickel and Monel

Pure nickel clippings	15½—17½
Clean nickel turnings	14 —15
Nickel anodes	16 —17
Nickel rod ends	16 —17
New Monel clippings	12 —13
Clean Monel turnings	7 — 8
Old sheet Monel	10 —10½
Old Monel castings	7½— 8
Inconel clippings	8 — 8½
Nickel silver clippings, mixed	7½— 8
Nickel silver turnings, mixed	5½— 6

Lead

Soft scrap lead	11¼—11¾
Battery plates (dry)	6½— 7

Magnesium Alloys

Segregated solids	6½— 7
Castings	4½— 5½

Miscellaneous

Block tin	73 —75
No. 1 pewter	53 —55
No. 1 auto babbitt	43 —45
Mixed common babbitt	11½—12
Solder joints	16½—17
Siphon tops	43 —45
Small foundry type	13 —13½
Monotype	12 —12½
Lino and stereotype	11½—12
Electrotype	10 —10½
New type shell cuttings	11 —11½
Clean hand picked type shells	4½— 5
Lino and stereo dross	5 — 5½
Electro dross	3¼— 3½

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect Freight equalized with nearest free delivery point.

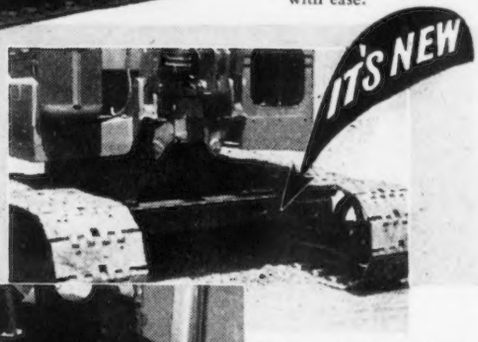
Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.5+

Here's a Crane that's Tailor Made for Handling SCRAP!

Special Axle:
New type axle has been increased in width and height. Multiple-hinged shoes have been increased in width from 20" to 24". The new UNIT 1020A now has equal stability over both sides and ends. Handles a 45" Magnet with ease.

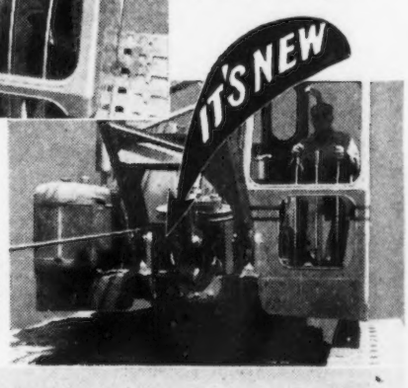
THE NEWLY DESIGNED UNIT 1020A

With All the Features You Need . . . or Ever Will Need!



- Pendant Boom Suspension . . . boom length can be altered without re-reeving boom hoist cable.
- Throttle Lever is within easy reach of operator . . . positive power and speed control at all times.
- Heavier, air-cooled Double Disc Clutches . . . for smooth performance and easy operation.
- Improved Automatic Traction Brakes with sectional linings which are easily replaced without removing shaft from machine.
- New leak-proof Oil Seals . . . keeps lubricants in . . . and dirt and abrasives out.
- New style foot brakes with self-aligning bearings on brake operating shafts. Wider, self-equalizing brake bands which eliminate dragging or scoring.

Swing Lock Control:
Hand operated swing lock control within easy reach of operator . . . no more stooping, kicking, or leaving cab for this operation.



New Type Magnet Fairlead:
This elevated Fairlead is especially adapted for magnet operation. It equalizes cable contact on two sheaves instead of one, minimizes unnecessary wear.

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SCRAP

Second Round of Buyers' Strike Begins

New York

• • • **Mills entered into** the second round of their buyers' strike this week. The first round was called a draw by most judges. Mill determination not to allow higher scrap prices to continue stopped the last strong price rise late in October.

That increase stopped, and the buyers' strike went on, only after most consumers had bought heavily in October. Then, the refusal of large mills to go into the market for scrap stopped the rise in No. 1 melting grades in the principal consuming markets. At the same time, however, the activity of smaller steel mills and foundries in scrap buying while the large mills have been out of the market has reduced the inventories that normally should have been accumulating in dealers' yards.

The new determination on the part of mills to keep prices at "voluntary ceilings" and not bid above then comes at a time when there will be even more pressure than before. Mills are not in the strong scrap position today that they were two months ago.

Mills and brokers, however, are back bidding on the basis of $40.50 in Pittsburgh delivered to consumer (the extra 50¢ reflects a change this week due to the changed freight rates). The chances of success in a buyers' strike in the scrap market, as in a consumer goods field, are fundamentally almost nil. The consumer is a single individual, in this case, bidding against other like consumers. He is disorganized, regardless of the number of his friends. He may drum up all his neighbors who are willing to say they will not, for example, buy beefsteak at over $1 per pound. But one of his neighbors always turns out to be a glutton —just cannot get on without his beefsteak. So, he being essentially honest, does not buy beefsteak at over $1, but he gets some super-special low phos beefsteak at $1.25. He has at least respected the letter of the law.

Thus, the whole scrap is revolving around a phantom. No. 1 heavy melting steel scrap is fast becoming a nebulous item around which price arguments flurry, and sample tonnages move in an effort to establish a market. But more and more of the market actually is in various special grades —be they low phos, No. 1 industrial, or whatever.

•

PITTSBURGH—What little business is trickling through the market is going at the formula price, which was boosted 50¢ last week. No volume is involved. Brokers are still out of the market along with mills. Early in the week there was no broker buying price here because no tonnages are offered at $40 and there is no inclination to take business at a slight boost in price for fear it won't hold. Local sources look for placing of some large orders soon though this area is still believed to have better mill scrap inventories than many others. Aside from the 50¢ increase for openhearth material that is moving a carload or so at a time there was a $1 rise in rail prices this week. The price of mixed borings and turnings quoted in the Jan. 8 issue was a mechanical error. It should have read $35 to $35.50, unchanged from the previous quotation.

•

CHICAGO—The consensus here is that the $39.50 price is as phoney as the former $39 and mills admit terrific resistance on the part of brokers and dealers to go along. It is becoming increasingly clear that the mills may be losing their dealer sources of supply. One factor is that all foundries are out paying top dollar for any kind of scrap they can get and much of this tonnage is in openhearth steelmaking grades. Foundries have paid $45 a gross ton in Chicago for what could be classified as ordinary No. 1 heavy melting and this practice will continue as long as cast iron is in short supply.

•

CLEVELAND — Only earmarked material is moving to major consumers at formula prices, and scrap inventories are dwindling rapidly. Rumors to the contrary, no openhearths have been taken off in this area because of scrap market conditions and it appears now that such reports represent a last ditch effort on the part of some consumers to keep the prices in line with the formula, which would seem to indicate that the acid test of formula prices is here at last. Foundry grades are very strong.

•

DETROIT—As some sources viewed the Detroit scrap market this week a dealer could hardly afford either to hold or sell the scrap accumulating in his snow-covered yard. Large mill buyers are holding to the formula and the small upward revision this week reflects the recent upward increase in freight rates. Scattered reports of out-of-town buyers paying more than the formula are tapering off and some circles feel that premium buying may have passed its peak. At the moment, the price of foundry scrap appears to be holding at $65 except for a few foundries in desperate circumstances.

•

BOSTON—The raising of Pittsburgh mill bids for openhearth steel 50¢ a ton has yet to be a market factor. The situation is so confused brokers have withdrawn all quotations. However, sales of mixed borings and turnings have been made at $30 a ton making them worth more than machine shop turnings.

•

PHILADELPHIA—Mills are refusing to place new heavy melting orders at prices higher than $41, but brokers are reported to be covering on old orders at prices ranging from $41.50 to $42.50. The heavy melting market is quoted at $41 to $42. Sales of turnings have been made at $35.50, an increase of $1 on the high side of the market.

•

NEW YORK—Withdrawal of small independent steel mills from the market here following a flurry of activity late last week has set the market into a new dull period. New broker offerings as of the middle of the week are restricted definitely to the $33.50 to $34.50 range.

•

BUFFALO—Strength of railroad scrap, buying by the Valley and higher prices for turnings were the features of the week's market. Railroad heavy melting went to a local consumer at $44, Warren and Youngstown were reported raiding here at several dollars over the formula, and both machine shop and shoveling turnings advanced $1.50. Even the 50¢ increase in the mills' formula to $39.75 was regarded bullish, although it got them nothing. A report carried by press and ticker services that No. 1 hvy melting had sold here at $45 created a flurry of excitement in other markets before the explanation caught up with it. Local dealers were kept busy for a time explaining that the sale made last month was a special transaction in foundry grade steel.

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BIRMINGHAM—Republic Steel Corp., this district's largest consumer of openhearth scrap, has advanced its price 50¢ to take care of the freight rate increase authorized by the ICCA. Some tonnages are moving at Republic's current price here of $37.50.

•

ST. LOUIS—Steel mills in this industrial district increased their buying prices for melting grades 50¢ a ton for this month. But dealers say this merely covers the increase in freight rates and that they are paying more to get the scrap which is being shipped to other markets. Foundry grades continue strong and to advance in price.

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	....	$40.50
RR. hvy. melting	$40.50 to	41.00
No. 2 hvy. melting	....	40.50
RR. scrap rails	51.00 to	52.00
Rails 2 ft. and under	55.00 to	56.00
No. 1 comp'd bundles	....	40.50
Hand bdld. new shts.	....	40.50
Hvy. axle turn.	**41.50 to**	**42.00**
Hvy. steel forge turn.	**41.50 to**	**42.00**
Mach. shop turn.	**35.00 to**	**35.50**
Shoveling turn.	37.00 to	37.50
Mixed bor. and turn.	35.00 to	35.50
Cast iron borings	**37.00 to**	**37.50**
No. 1 cupola cast	54.50 to	55.50
Hvy. breakable cast	**41.50 to**	**42.50**
Malleable	**60.00 to**	**61.00**
RR. knuck, and coup.	**52.50 to**	**53.50**
RR. coil springs	**52.50 to**	**53.50**
RR. leaf springs	**52.50 to**	**53.50**
Rolled steel wheels	**52.50 to**	**53.50**
Low phos.	**47.00 to**	**48.00**

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to	$40.00
No. 2 hvy. melting	39.50 to	40.00
No. 1 bundles	39.50 to	40.00
No. 2 dealers' bundles	39.50 to	40.00
Bundled mach. shop turn.	39.50 to	40.00
Galv. bundles	37.50 to	38.00
Mach. shop turn.	34.50 to	35.00
Short shov. turn.	36.50 to	38.00
Cast iron borings	35.50 to	36.00
Mix. borings & turn.	34.50 to	35.00
Low phos. hvy. forge	49.00 to	50.00
Low phos. plates	45.00 to	47.00
No. 1 R.R. hvy. melt.	48.00 to	49.00
Rerolling rails	63.00 to	64.00
Miscellaneous rails	57.00 to	58.00
Angles & splice bars	60.00 to	61.00
Locomotive tires, cut	57.00 to	58.00
Cut bolster & side frames	52.00 to	54.00
Standard stl. car axles	62.00 to	64.00
No. 3 steel wheels	56.00 to	57.00
Couplers & Knuckles	60.00 to	61.00
Rails 2 ft. and under	64.00 to	65.00
Malleable	75.00 to	76.00
No. 1 mach. cast.	69.00 to	70.00
No. 1 agricul. cast.	62.00 to	63.00
Heavy breakable cast	55.00 to	60.00
RR. grate bars	60.00 to	63.00
Cast iron brake shoes	60.00 to	61.00
Cast iron carwheels	58.00 to	60.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to	$40.00
No. 2 hvy. melting	39.50 to	40.00
No. 1 bundles	39.50 to	40.00
No. 2 bundles	39.50 to	40.00
Mach. shop turn.	33.50 to	34.00
Shoveling turn.	35.50 to	36.00
Cast iron borings	32.50 to	33.00
Mixed bor. & turn.	34.50 to	35.00
Low phos. plate	52.50 to	54.00
No. 1 cupola cast	61.00 to	63.00
Hvy. breakable cast	55.00 to	58.00
Rails 18 in. & under	61.00 to	65.00
Rails random length	55.00 to	59.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. melting	**$33.00 to**	**$35.00**
No. 2 hvy. melting	**31.40 to**	**32.00**
Nos. 1 and 2 bundles	**31.40 to**	**32.00**
Busheling	**31.40 to**	**32.00**
Shoveling turn.	**32.00 to**	**32.50**
Machine shop turn.	**28.50 to**	**29.50**
Mixed bor. & turn.	29.50 to	30.00
Cl'n cast. chem. bor.	....	34.00
No. 1 machinery cast.	50.00 to	55.00
No. 2 machinery cast.	50.00 to	55.00
Heavy breakable cast.	47.00 to	50.00
Stove plate	45.00 to	50.00

DETROIT

Per gross ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$35.00 to	$35.50
No. 2 hvy. melting	35.00 to	35.50
No. 1 bundles	35.00 to	35.50
New busheling	35.00 to	35.50
Flashings	35.00 to	35.50
Mach. shop turn.	30.00 to	30.50
Shoveling turn.	31.00 to	31.50
Cast iron borings	31.00 to	31.50
Mixed bor. & turn.	31.00 to	31.50
Low phos. plate	41.00 to	42.00
No. 1 cupola cast	62.00 to	65.00
Heavy breakable cast.	52.00 to	57.00
Stove plate	55.00 to	57.00
Automotive cast	62.00 to	65.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to	$42.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 bundles	41.00 to	42.00
No. 2 bundles	41.00 to	42.00
Mach. shop turn.	34.50 to	35.50
Shoveling turn.	35.00 to	36.00
Mixed bor. & turn.	34.50 to	35.50
Clean cast chemical bor.	40.00 to	42.00
No. 1 machinery cast	56.00 to	60.00
No. 1 mixed yard cast	54.00 to	57.00
Hvy. breakable cast	50.00 to	52.00
Clean auto cast	55.00 to	56.00
Hvy. axle forge turn.	42.50 to	43.50
Low phos. plate	47.00 to	47.50
Low phos. punchings	47.00 to	47.50
Low phos. bundles	46.50 to	47.00
RR. steel wheels	50.00 to	51.00
RR. coil springs	50.00 to	51.00
RR. malleable	65.00 to	70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to	$41.50
No. 2 hvy. melting	38.50 to	39.50
Bundled sheets	38.50 to	39.50
Mach. shop turn.	33.00 to	34.00
Locomotive tires, uncut	50.00 to	52.00
Mis. std. sec. rails	54.00 to	55.00
Rerolling rails	56.00 to	57.00
Steel angle bars	56.00 to	57.00
Rails 3 ft. and under	59.00 to	61.00
RR. steel springs	52.00 to	53.00
Steel car axles	52.00 to	53.00
Grate bars	54.00 to	55.00
Brake shoes	55.00 to	56.00
Malleable	70.00 to	71.00
Cast iron car wheels	56.00 to	57.00
No. 1 machinery cast	69.00 to	70.00
Hvy. breakable cast	55.00 to	56.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.50 to	$38.50
No. 2 hvy. melting	37.50 to	38.50
No. 2 bundles	37.50 to	38.50
No. 1 busheling	37.50 to	38.50
Long turnings	25.00 to	26.00
Shoveling turnings	27.00 to	28.00
Cast iron borings	26.00 to	27.00
Bar crops and plate	**38.00 to**	**38.50**
Structural and plate	**38.00 to**	**38.50**
No. 1 cupola cast	60.00 to	63.00
Stove plate	55.00 to	58.00
No. 1 RR. hvy. melt	37.50 to	38.50
Steel axles	**38.00 to**	**39.00**
Scrap rails	44.00 to	45.00
Rerolling rails	**52.00 to**	**54.00**
Angles & splice bars	47.50 to	50.00
Rails 3 ft. & under	52.00 to	56.00
Cast iron carwheels	48.00 to	50.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to	$40.50
No. 2 hvy. melting	40.00 to	40.50
Mach. shop turn.	35.00 to	35.50
Short shov. turn.	36.00 to	36.50
Cast iron borings	36.00 to	36.50
Low phos.	47.50 to	48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.50 to	$34.50
No. 2 hvy. melting	33.50 to	34.50
No. 2 bundles	33.50 to	34.50
Comp. galv. bundles	32.00 to	33.00
Mach. shop turn.	30.00 to	31.00
Mixed bor. & turn.	30.00 to	31.00
Shoveling turn.	30.00 to	31.00
No. 1 cupola cast	50.00 to	51.00
Hvy. breakable cast	50.00 to	51.00
Charging box cast	50.00 to	51.00
Stove plate	50.00 to	51.00
Clean auto cast	50.00 to	51.00
Unstrip. motor blks.	47.50 to	48.00
Cl'n chem. cast bor.	33.50 to	34.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to	$42.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 bundles	41.00 to	42.00
No. 2 bundles	41.00 to	42.00
No. 1 busheling	41.00 to	42.00
Mach. shop turn.	34.00 to	35.00
Shoveling turn.	36.00 to	37.00
Cast iron borings	**31.50 to**	**32.50**
Mixed bor. & turn.	**31.50 to**	**32.50**
Mixed cupola cast	53.00 to	55.00
Charging box cast	48.00 to	50.00
Stove plate	52.00 to	54.00
Clean auto cast	58.00 to	60.00
RR. malleable	70.00 to	75.00
Small indl. malleable	47.00 to	49.00
Low phos. plate	46.00 to	49.00
Scrap rails	49.00 to	50.00
Rails 3 ft. & under	52.00 to	54.00
RR. steel wheels	48.00 to	50.00
Cast iron carwheels	48.00 to	50.00
RR. coil & leaf spgs.	48.00 to	50.00
RR. knuckles & coup.	48.00 to	50.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to	$40.00
No. 2 hvy. melting	39.50 to	40.00
No. 1 bundles	39.50 to	40.00
No. 1 busheling	39.50 to	40.00
Drop forge flashings	39.50 to	40.00
Mach. shop turn.	34.50 to	35.00
Shoveling turn.	36.50 to	37.00
Steel axle turn.	39.50 to	40.00
Cast iron borings	35.50 to	36.00
Mixed bor. & turn.	34.50 to	35.00
Low phos.	44.50 to	45.00
No. 1 machinery cast	60.00 to	65.00
Malleable	70.00 to	72.00
RR. cast	63.00 to	65.00
Railroad grate bars	57.50 to	58.00
Stove plate	57.50 to	58.00
RR. hvy. melting	40.00 to	40.50
Rails 3 ft. & under	61.00 to	63.00
Rails 18 in. & under	61.00 to	63.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting	....	**$25.00**
No. 2 hvy. melting	....	**25.00**
No. 2 bales	....	**25.00**

Per gross ton delivered to consumer:

No. 3 bales	....	**$19.50**
Mach. shop turn.	....	**16.00**
Elec. furn. 1 ft. und	**$32.00 to**	**34.00**
No. 1 cupola cast	**32.00 to**	**33.00**
RR. hvy. melting	....	**26.00**

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	....	**$25.50**
No. 2 hvy. melting	....	**25.50**
No. 1 bales	....	**25.50**
No. 2 bales	....	**25.50**
No. 3 bales	....	**19.50**
Mach. shop turn.	....	**17.50**
No. 1 cupola cast	**$36.00 to**	**40.00**
RR. hvy. melting	....	**26.50**

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt	**$25.50 to**	**$26.50**
Elec. furn. 1 ft. and und.	**27.50 to**	**30.00**
No. 1 cupola cast	....	**27.50**
RR. hvy. melting	**25.00 to**	**26.00**

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point

Heavy melting	**$22.00***
No. 1 bundles	**22.00***
No. 2 bundles	**21.50***
Mechanical bundles	**20.00***
Mixed steel scrap	**19.00***
Mixed borings and turnings	**17.00***
Rails, remelting	**23.00***
Rails, rerolling	**26.00***
Bushelings	**17.00***
Bushelings, new fact., prep'd	**21.00***
Bushelings, new fact., unprep'd	**16.00***
Short steel turnings	**17.00***
No. 1 cast	**36.00 to 40.00**

*Ceiling Price.

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-rolled Steel: (cents per pound(	Jan. 13, 1948	Jan. 6, 1948	Dec. 16, 1947	Jan. 14, 1947
Hot-rolled sheets	2.80	2.80	2.80	2.50
Cold-rolled sheets	3.55	3.55	3.55	3.20
Galvanized sheets (10 ga.)	3.95	3.95	3.95	3.55
Hot-rolled strip	2.80	2.80	2.80	2.50
Cold-rolled strip	3.55	3.55	3.55	3.20
Plates	2.95	2.95	2.95	2.65
Plates wrought iron	6.85	6.85	6.85	5.95
Stain's c-r strip (No. 302) *24 gage	30.50	30.50	30.50	30.30
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes..	$6.80	$6.80	$5.75	$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	5.05	5.05
Special coated mfg. ternes	5.90	5.90	4.90	4.90
Bars and Shapes: (cents per pound)				
Merchant bars	2.90	2.90	2.90	2.60
Cold-finished bars	3.55	3.55	3.55	3.20
Alloy bars	3.30	3.30	3.30	3.05
Structural shapes	2.80	2.80	2.80	2.50
Stainless bars (No. 302)	26.00	26.00	26.00	25.97
Wrought iron bars	7.15	7.15	7.15	6.15
Wire and Wire Products: (cents per pound)				
Bright wire	3.55	3.55	3.55	3.30
Wire nails	4.25	4.25	4.25	3.75
Rails: (dollars per 100 lb)				
Heavy rails	$2.75	$2.75	$2.75	$2.50
Light rails	3.10	3.10	3.10	2.85
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$45.00	$45.00	$45.00	$42.00
Sheet bars	66.00	66.00	66.00	50.00
Slabs, rerolling	45.00	45.00	45.00	42.00
Forging Billets	55.00	55.00	55.00	50.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	61.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.80	2.80	2.80	2.55
Skelp	2.60	2.60	2.60	2.05

Pig Iron: (per gross ton)	Jan. 13, 1948	Jan. 6, 1948	Dec. 16, 1947	Jan. 14, 1947
No. 2, foundry, Phila.	$44.61	$44.61*	$40.97	$32.43
No. 2, Valley furnace	39.50	39.00	36.50	30.50
No. 2, Southern Cin'ti	43.28	43.28	40.24	31.75
No. 2, Birmingham	37.38	37.38	34.88	26.88
No. 2, foundry, Chicago†	39.00	38.00*	36.00	30.50
Basic del'd Philadelphia	44.11	44.11*	40.47	31.93
Basic, Valley furnace	39.00	38.50	36.00	30.00
Malleable, Chicago†	38.50	38.50*	36.50	30.50
Malleable, Valley	39.50	39.50	36.50	30.50
Charcoal, Chicago	62.46	57.46*	56.04	42.99
Ferromanganese‡	145.00	145.00	145.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.
* Revised.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$40.50	$40.00	$40.00	$32.25
Heavy melt'g steel, Phila.	41.50	40.50	40.50	31.00
Heavy melt'g steel, Ch'go	39.75	39.50	38.75	29.75
No. 1, hy. comp. sheet, Det.	35.25	35.00	34.75	27.00
Low phos. Young'n	47.75	47.25	47.25	34.25
No. 1, cast, Pittsburgh	55.00	55.00	53.50	40.38
No. 1, cast, Philadelphia	58.00	55.50	53.50	41.50
No. 1, cast, Chicago	69.50	63.50	63.50	42.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$12.50	$12.50	$12.50	$8.75
Foundry coke, prompt	14.00	14.00	14.00	8.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	21.50	21.50	21.50	19.50
Copper, Lake, Conn.	21.625	21.625	21.625	19.625
Tin, Grade A, New York	94.00	94.00	80.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	12.80
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	36.56	36.56*	37.67	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.25

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Jan. 13, 1948	3.18925¢ per lb.	$40.08 per gross ton.	$40.58 per gross ton.
One week ago	3.18925¢ per lb.	$39.58 per gross ton.	$40.00 per gross ton.
One month ago	3.18925¢ per lb.	$36.96 per gross ton.	$39.75 per gross ton.
One year ago	2.87255¢ per lb.	$30.14 per gross ton.	$31.00 per gross ton.

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1948	3.18925¢ Jan. 13		$40.08 Jan. 13	$39.58 Jan. 6	$40.58 Jan. 13	$40.00 Jan. 6
1947	3.18925¢ Aug. 12	2.87118¢ Jan. 7	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1941	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1940	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1939	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1938	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1937	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1936	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1935	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1934	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1933	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1932	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1931	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1930	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1929	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

—Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Hollowware enameling, gages 29 to 31 only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only: includes 3 pct freight tax. (14) Kaiser Co. prices (15) to 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (17) Delivered Los Angeles: add ½¢ per 100 lb for San Francisco. (18) Slab prices subject to negotiation in most cases. Some producers charge (19) $2 more, (21) $1 more. Some producers charge (22) 0.05¢ less, (24) 0.20¢ less.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS															
Carbon, rerolling	($36.00 f. o. b. mill) (Spot market as high as $88 to $90 gross ton)														
Carbon, forging	$46.00														
Alloy	$58.00									(Canton — $58.00)					
BILLETS, BLOOMS, SLABS															
Carbon, rerolling [18]	$45.00[19]	$45.00[19]	$45.00[19]	$47.00	$45.00[19]	$45.00[19]							$48.20[19]		
Carbon, forging billets	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00							$58.20		
Alloy	$66.00	$66.00				$66.00	(Bethlehem, Massillon, Canton — $66.00)						$69.20		
SHEET BARS							Subject to negotiation								
PIPE SKELP	2.60¢[21]						2.60¢[21]								
WIRE RODS	2.80¢[21]	2.80¢[21]		2.80¢[21]	2.85¢		(Worcester — 2.90¢[21])					3.52¢[13]			
SHEETS															
Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢		(Ashland, Ky. — 2.80¢)		3.54[17]¢	2.96¢	3.148¢	3.040¢
Cold-rolled [1]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.71¢	4.00¢	4.016¢
Galvanized (10 gage)	3.95¢	3.95¢	3.95¢		3.95¢		3.95¢	3.95¢	4.05¢	3.95¢	(Ashland —3.95¢)	4.82[17]¢		4.298¢	4.190¢
Enameling (12 gage)	3.95¢[22]	3.95¢[22]	3.95¢[22]	3.95¢			3.95¢		4.05¢	3.95¢			4.11¢[22]	4.466¢	4.406¢
Long ternes [2] (10 gage)	4.05¢[24]		3.85¢											4.566¢	4.506¢
STRIP															
Hot-rolled [3]	2.80¢	2.80¢	2.80¢	2.80¢[15]	2.80¢		2.80¢					3.60[17]¢	2.96¢	3.316¢	3.256¢
Cold-rolled [4]	3.55¢	3.65¢	3.65¢	3.55¢			3.55¢			(Worcester — 3.75¢)			3.71¢	4.066¢	4.006¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.616¢	
TINPLATE															
Cokes, 1.50 lb[5], base box	$6.80	$6.80	$6.80		$6.90			$6.90	$6.90	(Warren, Ohio — $6.80)				$7.248	$7.140
Electro, box 0.25 lb	Deduct $1.00 from 1.50 lb coke base box price														
Electro, box 0.50 lb	Deduct 80 ¢ from 1.50 lb coke base box price.														
Electro, box 0.75 lb	Deduct 60¢ from 1.50 lb coke base box price.														
TERNES, MFG., special coated	Deduct 90¢ from 1.50 lb coke base box price.														
BLACKPLATE, CANMAKING															
55 lb to 70 lb	Deduct $1.60 from 1.50 lb coke base box.														
75 lb to 95 lb	Deduct $1.70 from 1.50 lb coke base box.														
100 lb to 128 lb	Deduct $1.60 from 1.50 lb coke base box.														
BLACKPLATE, n. e. 29 ga [11]	4.75¢	4.75¢	4.75¢		4.85¢			4.85¢	4.85¢					5.198¢	5.090¢
BARS															
Carbon steel	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢					3.825[17]¢	3.06¢	3.35¢	3.356¢
Rail steel [6]	Subject to negotiation because of fluctuating scrap prices.														
Reinforcing (billet) [7]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢				3.325[17]¢		3.098¢	2.990¢
Reinforcing (rail)	Subject to negotiation because of fluctuating scrap prices.														
Cold-finished [8]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢							3.71¢	4.00¢	4.006¢
Alloy, hot-rolled	3.30¢	3.30¢	3.30¢			3.30¢	3.30¢	(Bethlehem, Massillon, Canton — 3.30¢)					3.46¢		3.432¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢			(Canton — 4.10¢)				4.26¢		
PLATE								(Coatesville — 3.15¢, Claymont — 3.40¢, Geneva, Utah — 3.10¢)							
Carbon steel [12]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢	2.95¢				3.838[14]¢		3.298¢	3.190¢
Floor plates	4.20¢	4.20¢												4.716¢	4.656¢
Alloy	3.80¢	3.80¢	3.80¢		(Coatesville — 4.50¢)									4.316¢	4.256¢
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢	(Geneva, Utah — 2.95¢, Bethlehem — 2.80¢)					3.43[10]¢		3.040¢	2.932¢
SPRING STEEL, C-R															
0.26 to 0.40 carbon	3.55¢			3.55¢			(Worcester — 3.75¢)								
0.41 to 0.60 carbon	5.05¢			5.05¢			(Worcester — 5.25¢)								
0.61 to 0.80 carbon	5.65¢			5.65¢			(Worcester — 5.85¢)								
0.81 to 1.05 carbon	7.15¢			7.15¢			(Worcester — 7.35¢)								
1.06 to 1.35 carbon	9.45¢			9.45¢			(Worcester — 9.65¢)								
MANUFACTURERS' WIRE [9]															
Bright	3.55¢	3.55¢		3.55¢	3.55¢		(Worcester — 3.65¢, Duluth — 3.60¢)					4.56[13]¢		4.022¢	4.006¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.60¢	4.60¢		4.60¢	(Worcester — 4.70¢, Duluth — 4.85¢) (Trenton — 4.85¢)							5.737[13]¢		5.072¢	4.964¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢								3.75¢	3.758¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	Subject to negotiation			Subject to negotiation		
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation			Subject to negotiation		
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt., Beth	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Jersey City, Reading, Canton, Youngstown, Balt, W. Leechburg	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton, W. Leechburg	32.48	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.78
Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Co	Base Per lb
18	4	1	—	—	82¢
18	4	1	—	5	$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢

High-carbon-chromium*	47¢
Oil hardening manganese*	26¢
Special carbon*	24¢
Extra carbon*	20¢
Regular carbon*	17¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.50¢
Armature	4.80¢
Electrical	5.30¢
Motor	6.05¢
Dynamo	6.75¢
Transformer 72	7.25¢
Transformer 65	7.95¢
Transformer 58	8.65¢
Transformer 52	9.45¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.75
Angle splice bars, 100 lb	3.25
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$3.10
Light rails (from rail steel), f.o.b. Williamsport, Pa.	3.45

	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.65¢
Tie plates, Pittsburg, Calif.	3.20¢
Track bolts	7.00¢
Track bolts, heat treated, to rail roads	7.25¢

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, St. Louis, Kansas City, Minnequa, Colo., Birmingham; tie plates alone—Steelton, Pa.; Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	10x14 in.	10x28 in.
8-lb coating I.C.	$7.05	$14.10

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad		
10 pct, f.o.b. Coatesville	30.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard & coated nails	$4.75†	$5.33
Galvanized nails‡‡	4.50†	5.03
Cut nails, carloads, Pittsburgh base	5.80*	....

† 30¢ additional at Worcester. ‡‡ Plus $2.50 per 100 lb galvanizing extra. * Less 20¢ to jobbers.

	Base per 100 lb	
Annealed fence wire	$4.20‡	$5.21
Annealed galv. fence wire	4.65‡	5.66

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago Birmingham

	Base column*	
Woven wire fence*	100	114
Fence posts, carloads	105††	...
Single loop bale ties	99	115
Galvanized barbed wire**	113	121
Twisted barbless wire	113	...

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. ††Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30
Cold-rolled	5.30	5.30	5.30	....	5.30	5.30	5.30	5.30	5.30
Galvanized	....	5.85	....	....	....	6.00	....	....	....
Strip									
Hot-rolled	4.30	4.30	4.30	....	4.30	4.30	4.30	4.30	4.30
Cold-rolled	....	....	5.30	....	....	5.30	5.30	5.30	5.30†
Shapes	....	4.30	....	....	4.30	4.30	4.30	4.30	....
Beams	....	4.30	....	....	....	4.30	....	....	....
Bars									
Hot-rolled	4.45	4.45	4.45	....	....	4.45	4.45	4.45	4.45
Bar shapes	....	4.45	....	....	4.45	4.45	4.45	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only
Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
⅛-in.	50½	34½
¼-in.	53½	38½
1-in.	56	41½
1¼-in.	56½	42
1½-in.	57	42½
2 in.	57½	43
2½ and 3-in.	58	43½
Wrought Iron, buttweld		
⅛-in.	+ 7	+29
¼-in.	2½	+19
1 and 1¼-in.	8	+11
1½-in.	13½	+ 7½
2-in.	14	+ 7
Steel, lapweld		
2-in.	49	34
2½ and 3-in.	52	37
3½ to 6-in.	54	39
Steel, seamless		
2-in.	48	33
2½ and 3-in.	51	36
3½ to 6-in.	53	38
Wrought Iron, lapweld		
2-in.	5½	+14½
2½ to 3½-in.	8	+10½
4-in.	12	+ 5
4½ to 8-in.	10	+ 6½

Extra Strong, plain ends

Steel, buttweld		
⅛-in.	49½	35
¼-in.	53½	39
1-in.	55½	42
1¼-in.	56	42½
1½-in.	56½	43
2-in.	57	43½
2½ and 3-in.	57½	44
Wrought Iron, buttweld		
⅛-in.	+ 2½	+23
¼-in.	3½	+17
½ to 2-in.	13	+ 7
Steel, lapweld		
2-in.	48	34
2½ and 3-in.	52	38
3½ to 6-in.	55½	41½
Steel, seamless		
2-in.	47	33
2½ and 3-in.	51	37
3½ to 6-in.	54½	40½
Wrought Iron, lapweld		
2-in.	8½	+11
2½ to 4-in.	17½	+ ½
4½ to 6-in.	13	+ 5

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

OD in In.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$16.67	$19.99	$16.17	$19.39
2½	12	22.42	26.87	21.75	26.06
3	12	24.93	29.90	24.18	29.00
3½	11	31.17	37.39	30.23	36.27
4	10	38.69	46.38	37.53	44.99

CAST IRON WATER PIPE

Per net ton

6-in. to 24-in. del'd Chicago $91.12
6-in. to 24-in. del'd New York..... 89.18
6-in. to 24-in., Birmingham 79.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less 105.90

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

Percent Off List

½ in. & smaller x 6 in. & shorter.. 45
9/16 & ⅝ in. x 6 in. & shorter..... 46
¾ in. & larger x 6 in. & shorter.... 43
All diam, longer than 6 in. 41
Lag, all diam over 6 in. long..... 44
Lag, all diam x 6 in. & shorter..... 46
Plow bolts 54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller 43
9/16 to 1 in. inclusive 42
1⅛ to 1½ in. inclusive 40
1⅝ in. and larger 35

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
7/16 in. and smaller		46
½ in. and smaller	44	..
⅝ in. through 1 in.		44
9/16 in. through 1 in.	43	..
1⅛ in. through 1½ in. ..	41	42
1⅝ in and larger	35	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate .... 65 and 10
In bulk 75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets *(½ in. and larger)*

Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $5.65
F.o.b. Lebanon, Pa. 5.80

Small Rivets *(7/16 in. and smaller)*

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 55

Cap and Set Screws

(In packages) *Percent Off List*

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright 53
¾ to 1 in. x 6 in., SAE 1035, heat treated 44
Set screws, oval points 56
Milled studs 29
Flat head cap screws, listed sizes.. 16
Fillister head cap, listed sizes..... 37

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$35.00
65% but less than 70%	34.00
60% but less than 65%	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer $5.95
Old range, nonbessemer 5.80
Mesabi, bessemer 5.70
Mesabi, nonbessemer 5.55
High phosphorus 5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots f.o.b. shipping point.

Brass, minus 100 mesh..... 24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh ..... 30⅝¢ to 34½¢
Copper, reduced, 150 and 200 mesh ..... 30½¢ to 32¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots....10¢ to 17¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags..7.4¢ to 8.5¢
Domestic sponge iron, minus 48 mesh ..... 10¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots ..... 8¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots ..... 63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe ..... 44¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe..... 39½¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe.....90¢ to $1.75
Aluminum, 100, 200 mesh, carlots .....23¢ to 29¢
Antimony, 100 mesh ..... 44¢
Cadmium, 100 mesh $2.00
Chromium, 100 mesh and finer.. $1.025
Lead, 100, 200 & 300 mesh 20½¢ to 25½¢
Manganese, minus 325 mesh and coarser ..... 59¢
Nickel, 100 mesh ..... 51½¢
Silicon, 100 mesh ..... 29¢
Solder powder, 100 mesh..8½¢ plus metal
Stainless steel, 302, minus 100 mesh...75¢
Tin, 100 mesh ..... 90¢
Tungsten metal powder, 98%-99%, any quantity, per lb..... $3.05
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb. $2.61
Under 100 lb $2.90

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$12.00 to $13.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	13.50 to 14.50
Foundry, Byproduct	
Chicago, del'd	$18.60
Chicago, f.o.b.	17.50
New England, del'd	19.75
Seaboard, Kearney, N. J., f.o.b.	17.85
Philadelphia, f.o.b.	17.75
Swedeland, Pa., f.o.b.	17.75
Buffalo, del'd	18.75
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	19.95
Cleveland, del'd	17.90
Cincinnati, del'd	18.59
St. Louis, del'd	18.03
Birmingham, del'd	15.76

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Carloads, Per 1000

No. 1, Ohio $67.00
First quality, Pa., Md., Ky., Mo., Ohio 73.00
First quality, New Jersey..... 78.00
Sec. quality, Pa., Md., Ky., Mo., Ohio 67.00
Sec. quality, New Jersey 70.00
No. 2, Ohio 59.00
Ground fire clay, net ton, bulk..... 10.50

Silica Brick

Pennsylvania and Birmingham $73.00
Chicago District and Alabama 82.00
Silica cement, net ton (Eastern)... 12.50
East Chicago 13.50

Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Plymouth Meeting, Chester $64.00

Magnesite Brick

Standard, Balt. and Chester $86.00
Chemically bonded, Baltimore 75.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in bulk $46.50
Domestic, f.o.b. Chewelah, Wash., in bulk 24.00
in sacks 28.00

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest; add 10¢; Missouri Valley; add 20¢..$11.00

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.47	$5.73	$5.82	$4.78	$5.88	$4.82	$4.55	$4.83	$5.53	$8.34	$8.44	$9.88	$9.95
New York	4.76	5.78[1]	6.16	5.59	5.92	5.11	4.78	5.08	5.63	8.58	8.73	10.18	10.33
Boston	4.82	5.89[12]	6.22[10]	5.12	5.69	5.17	4.87	5.04	5.69	8.82	10.47	10.24	10.39
Baltimore	4.31	....	5.71	4.76	....	4.76	4.68	4.81	5.51	....	....	....	....
Norfolk	4.80	....	....	5.20	....	5.05	5.05	5.10	5.90	....	....	....	....
Chicago	4.25	5.10	5.65	4.35	5.45	4.60	4.40	4.40	5.10	8.05	8.15	9.30	9.40
Milwaukee	4.457	5.307[1]	5.857	4.557	5.657[3]	4.808	4.607	4.608	5.307	8.407	8.507	9.657	9.757
Cleveland	4.25	4.95	5.78	4.52	5.00	4.60†	4.65	4.40	5.10	8.33	8.43	9.30	9.49
Buffalo	4.25	5.10	6.00	4.70	5.65[5]	4.95	4.40‡	4.40‡	5.10	8.05	8.15	9.30	9.40
Detroit	4.35	5.20	6.02	4.72	5.63	4.88†	4.77	4.50	5.22	8.50	8.60	9.73	9.78
Cincinnati	4.51	5.19	5.74	4.74	5.70	4.95	4.79	4.75	5.45	....	....	....	....
St. Louis	4.58	5.43[1]	5.87	4.68	5.82	4.88	4.73	4.73	5.47	8.57	8.67	9.82	9.92
Pittsburgh	4.25	5.10[1]	5.85	4.35	....	4.60	4.40	4.40	5.10	8.20[17]	8.37[17]	9.50[17]	9.65[17]
St. Paul	4.63	5.48[1]	5.88[2]	4.73[7]	....	4.93[7]	4.78[7]	4.78[7]	5.91[6]	....	....	....	....
Omaha	5.165	....	6.565	5.265	....	5.515	5.315	5.315	6.015	....	....	....	....
Indianapolis	4.553	5.324	5.874	4.653	5.753	4.903	4.703	4.703	5.403	....	....	....	....
Birmingham	4.45[11]	....	5.65	4.45[11]	....	4.65[11]	4.40[11]	4.40[11]	6.04	....	....	....	....
Memphis	4.82[11]	5.87[1]	6.37	5.02[11]	....	5.17[11]	4.97[11]	4.97[11]	5.87	....	....	....	....
New Orleans	*4.99[11]	6.28[1]	....	5.19[11]	....	5.34[11]	*5.04[11]	*5.14[11]	6.28[6]	....	....	....	....
Houston	5.30	....	6.60	5.25	....	5.35	5.15	5.30	6.80	9.40[17]	9.20[17]	10.35[17]	10.45[17]
Los Angeles	5.75	7.35[1]	7.40	6.05	8.70[5]	5.55	5.35	5.50	7.35[14]	9.55[15]	9.35[15]	10.95[15]	11.05[15]
San Francisco	5.40[8]	6.65	6.85	5.75[8]	....	5.50	5.20	5.05	7.50[10]	9.55[15]	9.35[15]	10.95[15]	11.05[15]
Seattle	5.45[4]	7.25[2]	6.85	5.60[4]	....	5.60[4]	5.25[4]	5.45[4]	7.45[14]	....	8.55[16]	....	9.115[16]
Portland	5.30[4]	7.10[2]	6.70	5.60[4]	....	5.45[4]	5.25[4]	5.55[4]	7.45[14]	....	....	....	....
Salt Lake City	6.40	....	7.85	6.70	....	6.20	6.35	6.55	7.55	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 450 to 1499 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) 1000 to 1999 lb.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ⅝ in. thick and 90 in. wide.

‡ Add 35¢ for sizes not rolled at Buffalo.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	40 00	40.50	41 00	41 50	.....
Birmingham	38.88	38.38-39.38	.....	.....	.....
Buffalo	40.00-41.50*	40.00-42.00*	40 50-42.50*	.....	.....
Chicago	38.50	39.00	39.50	40.00	.....
Cleveland	38.50-39.25*	39.00-39.75*	39.50-40.25*	.....	.....
Duluth	39.00	39.50	40.00	40.50	.....
Erie	38.50	39.00	39.50	40.00	.....
Everett	.....	45.00	45.50	.....	.....
Granite City	39 50	40.00	40 50	.....	.....
Neville Island	39.00	39.50	39.50	40.00	.....
Provo	38.00	38 50	.....	.....	.....
Sharpsville	39.00	39.50	39.50	40.00	.....
Steelton	40 00	.....	.....	.....	46.00
Struthers, Ohio	39.50	.....	.....	.....	.....
Swedeland	45.00	45.50	46.00	46.50	.....
Toledo	38.50	39.00	39.50	40.00	.....
Troy, N. Y.	.....	.....	.....	.....	46.00
Youngstown	39.00	39.50	39.50	40.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	....	45.50	46.00	.....	.....
Boston	Steelton	5.78	45.78	.....	.....	.....	51.78
Brooklyn	Bethlehem	3.60	43.60	44 10	44 60	45.10	.....
Cincinnati	Birmingham	5.85	44.73	42.23-45 23	..	.....	.....
Jersey City	Bethlehem	2.21	42 21	42.71	43.21	43.71	.....
Los Angeles	Provo	7.13	45 13	45.63	.....	.....	.....
Mansfield	Cleveland-Toledo	2.56	41.08-41.81*	41.56-42.31*	42.06-42.81*	42.56	.....
Philadelphia	Bethlehem	2.00	42.00	42.50	43 00	43 50	.....
Philadelphia	Swedeland	1.21	46 21	46.71	47.21	47.71	.....
Philadelphia	Steelton	2.59	42 59	.....	.....	.....	48 59
San Francisco	Provo	7.13	45 13	45.63	.....	.....	.....
Seattle	Provo	7.13	45 13	45.63	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	40 25	40 75	41 25	.....	.....

* Republic Steel Corp. price. Basis: Average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight. Bethlehem and Buffalo pig iron price increases not reflected in last week's price pages; correct Philadelphia delivered prices are quoted under date of Jan. 6 on the Comparison of Price page. Average price for southern iron delivered Cincinnati revised to reflect all three Birmingham producers' prices.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$47.50; f.o.b. Buffalo—$50.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous $55.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $62.46. High phosphorous charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$145
Less ton lots (packed)	189
Delivered Pittsburgh	151

$1.80 for each 1% above 82% Mn; penalty, $1.80 for each 1% below 78%.

Briquets

Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	8.70	8.95	9.50
Ton lots	10.30	10.90	12.80
Less ton lots	11.20	11.80	13.70

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$46.00	$47.00
F.o.b Pittsburgh	50.00	51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	31
L.c.l. lots	34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.07% max. C. 0.06% P. 90% mn.	23.00	24.85	26.05
0.10% max. C	22.50	24.35	25.55
0.15% max. C	22.00	23.85	25.05
0.30% max. C	21.50	23.35	24.55
0.50% max. C	21.00	22.85	24.05
0.75% max. C. 7.00% max. Si	18.00	19.85	21.05

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	7.80
Ton lots	9.45

Briquets

Contract basis, carlots, bulk freight allowed, per lb of briquet	8.75
Ton lots	10.35
Less ton lots	11.25

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, openhearth $81.00, foundry, $82.00; 14.01 to 14.50 pct, $78.75 f.o.b. Niagara Falls; $77.50 f.o.b. Jackson, Ohio Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add 50¢ per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	16.90	17.50	18.10
97% Si, 1% Fe	17.30	17.90	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	5.25	5.50	5.70
Ton lots	6.85	7.45	7.75
Less ton lots	7.75	8.35	8.65

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.50	....	....
50% Si	9.30	9.80	10.00
75% Si	11.80	12.10	12.85
85% Si	13.30	13.60	14.35
90% Si	15.00	15.30	16.00

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	26.50	26.90	27.00
0.10% C	26.00	26.40	26.50
0.15% C	25.50	25.90	26.00
0.20% C	25.25	25.65	25.75
0.50% C	25.00	25.40	25.50
1.00% C	24.50	24.90	24.75
2.00% C	24.25	24.65	24.75
65-69% Cr, 4-9% C	18.60	19.00	19.15
62-66% Cr. 4-6% C. 6-9% Si.	18.60	19.00	19.15

Briquets

Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	12.50	12.75	12.85
Ton lots	14.00	14.90	15.50
Less ton lots	14.90	15.80	16.40

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S M Ferrochrome

Contract price, cents per pound chrominum contained, lump sie, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	19.70	20.10	20.25
Ton lots	21.85	23.15	23.95
Less ton lots	23.35	24.65	25.45

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	25.00	25.40	25.50
Ton lots	27.30	27.95	29.15
Less ton lots	29.10	29.75	30.95

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, packed, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	97.00	98.50	99.75
0.50% max. C	93.00	94.50	95.75
9.00% min. C	91.50	93.00	94.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	16.25	16.75	18.80
Ton lots	19.35	20.10	22.25
Less ton lots	20.85	21.60	23.75

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	17.50	18.00	20.05
Ton lots	19.80	20.65	22.40
Less ton lots	20.80	21.65	23.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots	$1.85	$2.70 $3.40
Less ton lots	2.20	3.05 4.20

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr. 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	18.00	19.10	21.05
Less ton lots	19.25	20.35	22.30

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	15.75	16.85	18.80
Less ton lots	17.00	18.10	20.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa. York, Pa., per pound contained W, 5 ton lots, freight allowed	$2.25
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2	$1.20
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb	
Ton lots	$2.50
Less ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 40-45%, f.o.b Langeloth, Washington, Pa., Per pound contained Mo.	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y. ton lots, per pound contained Ti	$1.35
Less ton lots	$1.35
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High carbon ferotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton	$65.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	13.40¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	6.00¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	6.90¢
Ton lots	7.40¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	9.00¢
Ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
100 lb or more	$1.20	$1.23	$1.21

Manganese — Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$1.80	$1.8125	$1.8445

Silicaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots	39.00¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed on 50 lb and over

No. 1	93¢
No. 6	63¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed. Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0% Al 1.0—2.0%.

Ton lots, per pound	3.0¢